

POWER PROGRESS

I N T E R N A T I O N A L

THE LEADING MAGAZINE FOR POWER SYSTEM, COMPONENT AND EQUIPMENT INFORMATION

SUBSCRIBE NOW!



EXECUTIVE INTERVIEW
ANNA MÜLLER, VOLVO PENTA

SHOW PREVIEW
IAA TRANSPORTATION 2024

COUNTRY REPORT: SPAIN
COMPANIES TACKLE NEW MARKET CHALLENGES

EMISSIONS REDUCTION
BESS ADDITION CUTS MICROGRID IMPACT

ALTERNATIVE FUELS
'GREEN' POTENTIAL OF NEW PRODUCT

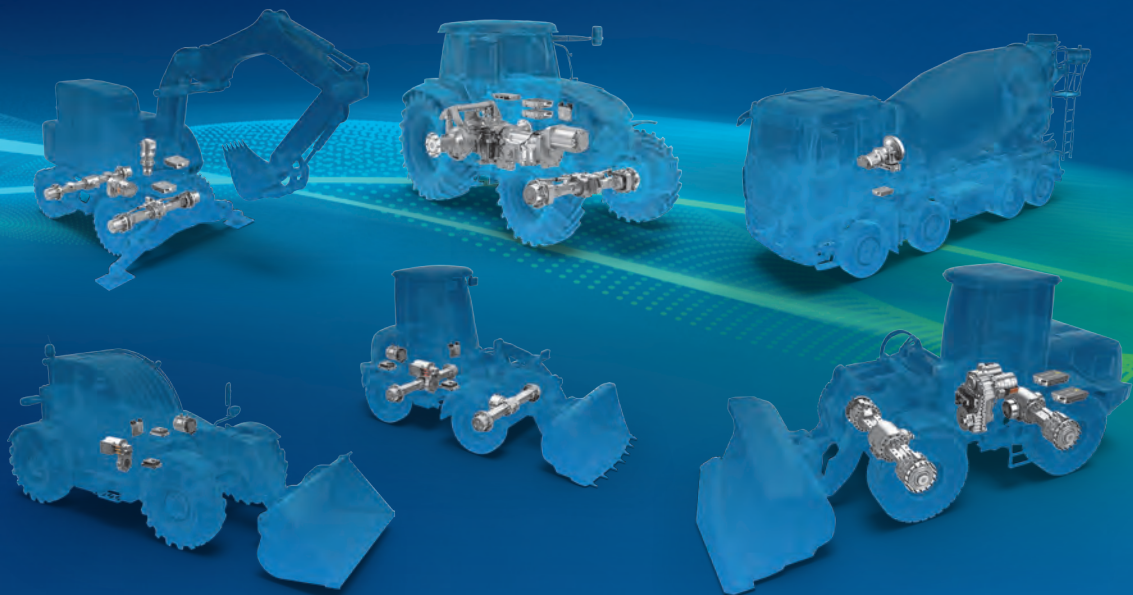
SUSTAINABLE MARINE POWER

NEW TECH REDUCES ENVIRONMENTAL IMPACT



Electrified Efficiency. Engineered by ZF.

The trend towards electromobility is not confined to passenger cars. Thanks to ZF technology, off-highway machinery can be 100% electric, and thus climate-friendly, locally neutral in terms of CO₂ emissions.



Emission-free and eco-friendly

Guided by the principle of zero emissions, ZF strives to enable work machinery to operate completely emission-free in the future – without compromise on efficiency and productivity. Being a systems supplier, ZF not only delivers the unit, but offers a combination of front and rear axles, drives, inverters and electric Drive Control Unit for all relevant construction applications up to 210kW. [ZF.com/construction](https://www.zf.com/construction)



EDITORIAL

EDITOR
Julian Buckley
julian.buckley@khl.com
CONTRIBUTING EDITOR
Becky Schultz
becky.schultz@khl.com
ASSOCIATE PUBLISHER
Roberta Prandi
roberta.prandi@khl.com

PRODUCTION
**CLIENT SUCCESS & DELIVERY
MANAGER**

Charlotte Kemp
charlotte.kemp@khl.com
GROUP DESIGN MANAGER
Jeff Gilbert
jeff.gilbert@khl.com
GROUP DESIGNER
Jade Hudson
jade.hudson@khl.com
CREATIVE DESIGNER
Kate Brown
kate.brown@khl.com

CIRCULATION
SUBSCRIPTIONS
circulation@khl.com
CIRCULATION EXECUTIVE
Laura Walker
laura.walker@khl.com

SALES
VICE PRESIDENT, SALES
Alister Williams
+1 843 637 4127
alister.williams@khl.com
ASSOCIATE PUBLISHER
Roberta Prandi
+39 (0)464 014421
roberta.prandi@khl.com
REGIONAL SALES MANAGERS
Gabriele Dinsel
+49 711 3416 74 71
gabriele.dinsel@khl.com
Thomas Kavooras
+1 312 929 3478
thomas.kavooras@khl.com

Josh Kunz
+1 262 754 4139
josh.kunz@khl.com
Niki Trucksa
+1 262 754 4136
niki.trucksaa@khl.com
**INTERNATIONAL SALES
EXECUTIVES**
Dey Gomez
+44 (0)1892 786239
dejuan.gomez@khl.com
Greg Roberts
+44 (0)1892 786238
greg.roberts@khl.com

CHIEF EXECUTIVE OFFICER
James King

CHIEF FINANCIAL OFFICER
Paul Baker

CHIEF OPERATING OFFICER
Trevor Pease



KHL Group Americas LLC
14269 N 87th Street, Suite 205
Scottsdale, AZ 85260 USA
americas@khl.com

COMMENT

Fuels for the here and now



Julian Buckley

Editor, *Power Progress International*
julian.buckley@khl.com
+44 (0)7710 096 684

Prior to its illegal invasion of Ukraine, an estimated 40% of all diesel fuel in the European distribution network was delivered from Russia. As international sanctions came into effect, supply of Russian fuel dwindled to a trickle.

Fear that European economies could grind to a halt without any diesel saw governments support development of alternative energy carriers. Of all the potentials, hydrogen looked like a good bet. Not only was fuel cell technology ready to go, but development of H2 internal combustion (IC) engines was already well advanced. And ‘green’ hydrogen came with the added benefit of being a zero-carbon fuel.

Moving forward, where do we stand with the hydrogen economy? Last year saw a series of OEMs unveil their prototype hydrogen IC engines. This year, both the United States (\$7 billion) and the EU (€6.9 billion) announced support for production of ‘clean’ hydrogen.

Looking at the US initiative, this is targeting an annual output of 10 million tonnes of hydrogen by 2030 – from virtually zero output now. So, while intentions are good, there is a clear need for a clean fuel to fill that interim period.

In this issue’s Alternative Fuels section (starting on page 30), we take a look at HVO (hydrotreated vegetable oil) and biodiesel to see which of these is likely to be filling commercial fuel tanks. While HVO is a drop-in replacement for diesel, production is still ramping up; on the other hand, biodiesel already features on virtually every European forecourt, but only combined with fossil fuel in small percentages.

But more than that, the growing availability of these fuels (and the engines to support them) calls into question the European ban on IC engines in passenger cars (from around 2035). The German government has already won an exemption permitting the sale of vehicles with IC engines post-2035, if they are limited to using only e-fuels.

While off-highway machines and heavy goods vehicles are not subject to an IC engine sales ban, there is still the need to reduce their emissions. But while hydrogen fuel production comes online, HVO and (possibly) biodiesel are both solutions for the here and now – which brings up another question. With low- and zero-carbon fuels for IC engines already available, is there a need for hydrogen at all?

MEMBER OF:



THE POWER PORTFOLIO

MAGAZINES



DAILY NEWSLETTER



WEEKLY NEWSLETTER



SOURCING GUIDE



EVENT



WEBSITE





COOLANT PUMPS

12V & 24V - 300W | 650W | 900W

△
AVAILABLE

Sealed *Brushless*®

Visit us in
Hannover to discover
our **New Products**
September 17-22, 2024

Hall 23,
Booth A42

» IAA
TRANSPORTATION

PRODUCT FEATURES

SPAL is now offering a new range of high performance brushless pumps, specifically designed to meet the new generation cooling systems requirements.

The **SPAL Coolant Pump** is the strong and reliable solution for increased system efficiency in any advanced vehicle design.

- Sealed Brushless Motor resistant to corrosion & water (IP68/IP6K9K Drive)
- PWM controlled, CAN and LIN version available
- Robust & Reliable
- High Efficiency
- Intelligent Drive
- Variable speed control





In this issue, a celebration of alternative fuels and marine power



8

New Volvo Penta president speaks exclusively with PPI



24

Banking on quality to win out over low price in Spain



46

BESSs can store renewable energy for later use

CONNECT WITH US

You can read Power Progress International both electronically and in print. The electronic version will be delivered via email on the day of publication. To subscribe please visit www.khl.com/free-subscription

PPI is also available for you to read on your smart phone or tablet including Apple, Android, Windows and Kindle Fire. This format is enhanced with additional content including 360 degree photos, audio and video. To download the latest issue visit: pocketmags.com

POWER PROGRESS INTERNATIONAL

(ISSN 1091-3696) Volume 43, No. 3 - Published four issues/year (January-March, April-June, July-September, October-December), by KHL Group Americas LLC, 14269 N 87th Street, Suite 205, Scottsdale, AZ 85260, USA. Subscription rates are \$140.00/£100.00/€120.00 per year. Periodicals postage paid at Waukesha, WI 53186 and at additional mailing offices. Canadian Publication Mail Agreement # 40035419. Return Undeliverable Canadian Addresses to: P.O. Box 456, Niagara Falls, ON L2E 6V2, Canada. POSTMASTER: Send address changes to: Circulation Manager, KHL Group, Southfields, South View Road, Wadhurst, East Sussex TN5 6TP, UK. e-mail: circulation@khl.com

CONTENTS

8 Executive Interview: Anna Müller, president, Volvo Penta

24 Country Report: Spanish companies leverage quality and customer service

42 Hydraulics & E-motors: Danfoss expert compares off-highway power solutions

46 Emissions Reduction: Adding BESSs improves microgrid performance, says Rolls-Royce Power Systems

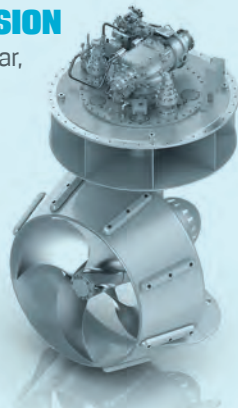
MARINE PROPULSION

13 News: ZF, Caterpillar, Alfa Laval

16 Suzuki outboards incorporate green technology

18 OMT develops new ammonia fuel injectors

20 Siemens Energy builds low-carbon power systems



ZF launches new high-efficiency azimuth thruster 13

SPECIAL REPORT ALTERNATIVE FUELS

30 Neste's Carrie Song on building the market for renewable diesel, aka HVO

34 BEST research on the ups - and downs - of the biodiesel market

38 New Holland plans a circular economy based on locally-produced biomethane

40 Kohler Engine's Demo Days event highlights power and fuel flexibility

SHOW PREVIEW

48 IAA Transportation 2024: OEMs and Tier suppliers prepare for Europe's largest CV show

DEPARTMENTS

3 Comment

7 Global Roads: CV market will benefit from joined up H2 IC emission regulations

50 Notebook South America: Diversified market can deliver energy security



Copyright © 2024 KHL Group Americas LLC. All Rights Reserved. Materials protected by U.S. and international copyright laws and treaties. Unauthorized duplication and publication is expressly prohibited.

Printed by: Buxton Press

The paper in this magazine originates from timber that is sourced from sustainable forests, managed to strict environmental, social, and economic standards. The manufacturing mill has both FSC & PEFC certification, and also ISO9001 and ISO14001 accreditation.



30

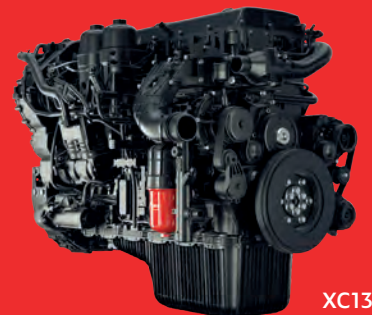
Neste is planning to increase HVO output and distribution



***YOU EXTEND
THE MISSIONS***

***WE REDUCE
EMISSIONS***

XC13 is the first single-base, multi-fuel engine of FPT Industrial, the brand always at the forefront of the quest for maximum efficiency and sustainability of internal combustion engines. Best-in-class for power, torque and engine brake, the XC13 reduces fuel consumption and CO₂ emissions by up to 7% in the Diesel version and up to 8% in the Natural Gas version vs MY22. Available soon in the hydrogen version, the XC13 is ready for next-generation emission challenges.



XC13



Volvo will start trials of H2 IC trucks in 2026



ABOUT THE AUTHOR

OLIVER DIXON is an industry analyst based both in the US and the EU for Global Highways, which covers the commercial vehicle industry worldwide. Email: ohcdixon@icloud.com



Read the title again – it's a good question. And for those in charge of procurement decisions in the age of decarbonization, a very pertinent one, too. The Paris Agreement outlined drastic cuts in vehicle GHG emissions but gave precious little guidance as to how this should be achieved. This resulted in any number of solutions seeking traction in the post-IC [internal combustion] commercial vehicle world.

Battery-electric tech appears to have the lead at present, while enthusiasm for fuel cell electric vehicles and hydrogen seems to have peaked. That said, hydrogen IC engines have caught the eye of some companies; Volvo is planning to begin in-service on-highway trials in 2026.

CNG, the long-standing but little-used fuel, has become renewable natural gas and with it, gained a new lease of life, particularly for such applications as refuse collection and other hub-based work. Then there are the other possible players, such as ammonia. In these heady times, it's easy

CAN ONE EVER HAVE TOO MUCH CHOICE?

Our correspondent believes that clarification on engine emission regulations will be critical to gaining direction for engine tech R&D spend. By **Oliver Dixon**

to forget that there are even a few diesel-powered trucks being sold.

It's an embarrassment of riches and, increasingly for some, an irritation of riches.

R&D SPEND

The average value of R&D expressed as a percentage of sales over Q4 2024 (for companies with a significant exposure to the truck industry) was around 5.8%. Although this is not quite the highest we've seen over the past three decades (that medal goes to Q3 2008, a period which readers with longer memories may recall as having little regulatory disturbance across the global truck market, in combination with a touch of global financial crisis), this current quarter is troubling.

In the past, R&D spend had a ceiling, a defined point at which regulation would come into effect. If you weren't ready, you'd likely be out of business. That's not the case this time around and while gravity – or stockholder sentiment – will inevitably take over, quite when that point will be is difficult to discern.

GUIDANCE REQUIRED

The industry could do with some help here. Take the vexing question of H2 IC power. In India, it seems to tick a lot of boxes, including energy independence. In traditional heavy-haul operations it looks to be a good idea. Yet there is still no joined up plan from regulators. Europe regards – or at least Volvo

believes it will regard – H2 IC as a zero-emission technology. On the other hand, California thinks otherwise, with H2 IC viewed as reduced-emission technology. The EPA seems minded to agree.

Why is this important? As we move forwards through the decarbonization era things, things will become more binary. An engine will either be compliant, or it will not. But there still seems to be the opportunity for unnecessary and potentially very expensive confusion if we cannot establish quite what will be acceptable. A lot of money has already been spent and more will follow. Under the circumstances, good guidelines would represent good housekeeping. **PPI**

SUSTAINABLE LEADERSHIP

Julian Buckley speaks with **Anna Müller**, president of Volvo Penta, about her experience so far and how new tech will help achieve the company's emissions reduction targets and sustainability goals

Müller immediately comes across as being highly dedicated to driving the business forward. Asked how the experience has been for her personally, she replies that her previous roles at the Volvo Group have stood her in good stead.

"I come from a background at Volvo Trucks; it's not exactly the same, with the level of technology development here [at Volvo Penta]. But I was driving a sales organisation with about 3,000 people across northern Europe, selling about 24,000 trucks each year. So I wouldn't say I'm either more or less busy, it's just another type of complexity."

As to the day-to-day of her role, whether that covers customer interactions or the quest for best practices and improved efficiencies, she has this to say: "I don't think you can say 'or' with that question! 'And' would be more appropriate. I'm not putting deals together, but I've always loved to meet with customers. Of course, it's also very important to focus on internal operations, communicate the direction needed to achieve our priorities."

EMISSIONS REDUCTIONS

Volvo Penta has some ambitious emissions reductions targets. By 2030, the company is

10 >



I believe the customer comes first and that's a very clear policy at the company"

ANNA MÜLLER,
Volvo Penta

Anna Müller took over as president of Volvo Penta in December 2023. She replaced Heléne Mellquist, who left the Volvo Group to take a senior position at an investment firm. Müller first joined the Volvo Group in 2014, working in business development. From there, she was appointed senior vice president for Europe North and Central Division at Volvo Trucks before being selected for this latest role.

In an exclusive interview with *Power Progress International*, Müller started out by offering a review of company performance since she took over as president. "We've had a good start to the year, a good first quarter. But there has been a lot of getting to know the organisation, meeting customers and partners. We've been continuing to roll out our [emissions reduction] strategies, outlining where we want to be by 2030 and beyond."

MOL electric terminal tractor at Ghent harbour; EVs will help Volvo Penta achieve emissions targets





YANMAR

ABSOLUTELY NOTHING I CAN'T HANDLE



**WITH A STRIKING 105KW, THE 4TN101
IS ALL YOU NEED TO GET THE JOB DONE.**

Having the best in class engine under the hood, the 4TN101 engine is your best excuse to take on any job. Giving you 105kW and a staggering 550Nm of torque, it can handle anything you put it up to. Yanmar provides you with a free 5-year warranty on this engine. Because we believe that, as it comes to reliability, Yanmar has yet to be beaten. More information? Visit yanmar.com/eu/industrial



looking to cut emissions from plants and related logistics by 50%. By 2034, the goal is to reduce absolute emissions by 37.5% across operations, products and all transport.

Asked to give an update on these plans, Müller says they are still within reach. “As the Volvo Group, with Volvo Penta being a part of that, we have committed to the science-based targets (SBTs) outlined in the Paris Agreement [an international treaty on climate change adopted in 2015 covering mitigation, adaptation and financing to support emissions reduction strategies]. That means there are tough requirements for CO₂ reduction.

“Right now, we are tracking according to our plan. It’s challenging, I think that’s the right way to describe it. We’re planning on using different levers to achieve these targets, as the Volvo Group and Volvo Penta. We’re working on several different technologies to deliver the necessary results.”

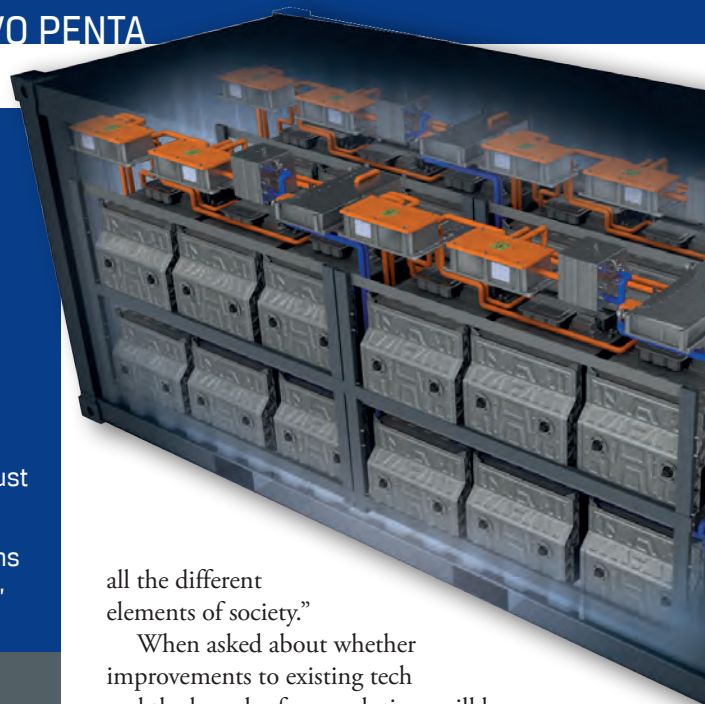
Those technologies include continuing to improve internal combustion engine tech, while leveraging alternative fuels to reduce related emissions. There’s also continuing development of full electric and hybrid solutions, together with hydrogen fuel cells.

With that in mind, Müller says that it’s not the OEM working in isolation. “Everything is interdependent. As a society we all need to move forward. I fully subscribe to what Martin [Lundstedt, MD of Volvo] has said, in that partnership is the new leadership. We need to have partnership, but in a completely different way than before. It’s now about connecting



We have committed to becoming a net-zero emissions company by 2050, which means we must transform our own operations and products”

ANNA MÜLLER,
Volvo Penta



all the different elements of society.”

When asked about whether improvements to existing tech and the launch of new solutions will be sufficient to meet emissions reduction targets, or if outside factors such as carbon credits would be required, Müller had this to say.

“When you’ve subscribed to the science-based targets, you should be able to achieve those by yourself. We have committed to becoming a net-zero emissions company by 2050, which means we must transform our own operations and products. So, it’s up to us to develop the different technologies which deliver the necessary solutions,” she explains.

BATTERY POWER

One of the cornerstones of emissions reduction at Volvo Penta has been based on helping customers make the switch from internal combustion to battery-electric power. Yet despite the considerable investment, sales of battery-electric machines are still slow.

Müller, though, says those numbers are still meeting expectations. “Of course, we would always like to see more sales, that’s the name of the game. But it’s still early days. What we can do is continue to offer battery solutions across as many applications as we can, deliver as many solutions to customers as we can. Honestly, I don’t think anyone expected us to be anywhere else than where we are right now [in terms of total volumes].”

She says that sales of electrified products can be further supported by educating the customer about best use the new technology; the necessary changes to work cycles, etc.

“We’ve been working on this at Volvo Trucks, suggesting different driving styles to get the best range [from electric trucks], when to charge, etc. It all plays into a successful transition. The

Achieving emissions targets

Measuring the success of a given tech in reducing CO₂e emissions, with improvements building towards the outlined target, Müller explains that the basic methodology is to compare the CO₂ emissions of the product sales mix in 2019, the baseline year, with those of a later year. The difference in terms of total emissions delivers the rate of improvement.

“If I add an electric motor to what was a [standalone] diesel engine, improve the efficiency of that product over the 2019 baseline, then that will reduce overall emissions and take away from the total CO₂ emissions produced over its working life and our SBT measure.”

In addition to performance improvements across the product portfolio, Volvo Penta is also looking to reach zero greenhouse gas emissions across its supply chain by 2050. Asked if there was anything the company could do to help support those reductions across Scope 3 activities, Müller replies: “It’s about partnership. Many of our suppliers have also committed to the SBTs. We have an on-going dialogue with those companies, which helps our alignment within the Volvo Group and how we carry out follow-up measurements.”



Volvo Penta BESS will reduce customer emissions

customer needs to know how to optimise their use pattern, in the harbour, in the field, or wherever the machine is operating.”

MARKET DRIVERS

So far, local low-emissions regulations have been the primary driver behind battery-electric machine sales. Is it possible that in the future, basic market demand will take over, supported by more product knowledge?

“OEMs and their customers need to invest a lot to change technology. We need the authorities to support us in that process. Regulations, incentives, these can all support that. Society and governments have to support the energy transition and move forward together.

“We’re still only at the start of the technology market transformation – we’ve still only just presented the first solutions to our customers,” she explains. “We’ve had more than 100 years of diesel engine development and only 10 or 15 years to make the shift to new, low-emission solutions. This transformation is ongoing.”

Together with the push for emissions reductions, Volvo Penta has also targeted a ‘zero accidents’ future. While this would likely remove

the human operator from the machine, Müller says that autonomy can take many forms.

“We’re working with different types of autonomy across the Volvo Group. At the ACT Expo [in May] Volvo Autonomous Solutions launched the VNL Autonomous truck. But there are different levels of autonomy; not all mean that there’s no operator. Instead, the systems support the operator in various ways. I think the assisted docking feature we offer through the Marine division is a perfect example of that.”

Taking that one step further, Müller is asked whether Volvo Penta has been able to successfully leverage AI in development of new features and tech. With a polite laugh, she respectfully declines to offer any related details, other than to say the company has been looking into ways the tech could be used.

To round out the conversation, Müller was asked about how well her own views on technology development aligned with those of Volvo Penta. “I think it’s a very good match. I believe the customer comes first and that’s a very clear policy at the company. I firmly believe in achieving improved sustainability and that is a key part of my role as company leader.” **PPI**

Acce/eron


Decarbonization:
from vision to viable

Meet us at
SMM 2024,
Hall A3, Stand 210


100

years of turbocharging the world
1924 ————— 2024


INNOVATIVE LEVEL AND TEMPERATURE MEASUREMENT – DRIVING EXCELLENCE IN E-MOBILITY AND CLASSIC APPLICATIONS



NEW



Whether battery, fuel cell or classic applications such as combustion engines or fuel tanks – BEDIA has been a valued and reliable partner to major manufacturers of construction and agricultural machinery, **ships**, commercial vehicles, **rail** vehicles, engines, power units and compressors for almost 40 years.

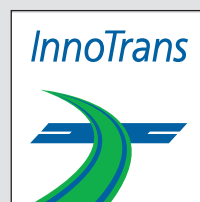


For further information please contact: ☎ + 49 (0) 9187 9509 632 ✉ bedia-sales@bedia.com

Visit us at



03rd – 06th September 2024
Hall: B6 / Stand: 133



24th – 27th September 2024
Hall: 18 / Stand: 360

ZF INTRODUCES AT 50 SERIES AZIMUTH THRUSTER

ZF has extended its marine thruster portfolio with the addition of the new AT 50 Series model. The AT 50 joins a lineup which includes the larger AT 80 and AT 90.

The AT 50 was developed jointly by ZF Krimpen in The Netherlands and ZF Friedrichshafen in southern Germany.

The new azimuth thruster is intended for vessels with power outputs up to max. 815 kW per single unit and a bollard pull of up to 28 tonnes with a twin thruster installation. The bollard pull rating makes the AT 50 particularly suited to use with tugboats, offshore support

**ZF AT 50
marine
thruster**



vessels, icebreakers, dredgers, salvage and rescue ships.

Available as an L- or Z-drive, the unit can be installed as a well-mounted, deck-mounted, stern-mounted, tunnel or retractable thruster.

Featuring an optimised gear design and hydrodynamic outer casing, the AT 50 is said to be up to 17% more efficient than its predecessor, reducing emissions and lifecycle costs.

The WM type of the AT 50 can also be fitted as a hybrid version, with an electric motor added to the diesel-powered unit. This can deliver locally emission-free propulsion.

PPI

Caterpillar Marine to deploy 3500E marine variant in 2026

Caterpillar Marine is to deploy the first field demonstrators of the 3500E marine engines in 2026.

The trials will be carried out as part of an MoU with Damen Shipyards Group.



**Cat 3500E
marine engine**

Cat 3500E marine engines feature dual-fuel technology which combine proven diesel fuel systems with low-pressure (below 10 bar) fuel systems. For example, the methanol dual-fuel Cat 3500E is said to deliver 100% of the power of the existing 3500E diesel, while meeting related emissions standards.

The existing 3500E diesel is a V16 four-stroke diesel engine. Power output ranges from 2800 to 3000 kW (3755 to 4023 bhp) at 1800 rpm. While this engine is IMO 2 compliant, it is anticipated that the dual-fuel variant will meet IMO 3 standards.

"We're expanding the 3500E platform's fuel flexibility to provide customers with a wider array of options to navigate the energy transition," said Andres Perez, global tug segment manager at Caterpillar Marine.

MORE THAN 100 ORDERS FOR ALFA LAVAL METHANOL

Alfa Laval has reported receiving more than 100 orders for its low-flashpoint fuel supply system (LFSS) FCM Methanol. The company states that this reflects 'the increasing trust shipyards and shipowners have in Alfa Laval's fuel treatment expertise'.

A 'transformative shift' towards decarbonisation has prompted the maritime industry to investigate a series of replacement fuel types for bunker diesel. Of these, methanol has emerged as a preferred alternative.

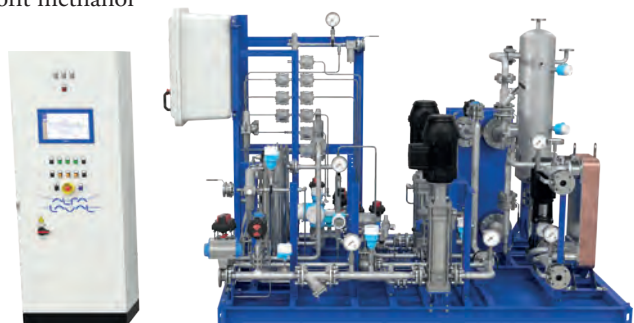
According to the Methanol Institute, more than 250 new methanol-capable vessels have been ordered worldwide to date. Further, methanol is the most contracted alternative fuel type in 2023.

Alfa Laval has established FCM Methanol as a solution for methanol handling. Introduced in 2015, the system has the longest period in operation, logging in excess of 450,000 hours at sea.

Additionally, the company has developed specialised service kits for optimising FCM maintenance. In addition to new builds, Alfa Laval has been selected to retrofit methanol

systems in a series of existing vessels. The first of these is set for installation on a Maersk ship. **PPI**

**Third generation
of Alfa Laval's FCM
Methanol system**



THE ITALIAN REPUBLIC
IN THE NAME OF THE ITALIAN PEOPLE
TRIBUNALE ORDINARIO di BOLOGNA
Business Section

The Court, sitting as a panel composed of the following judges:

Mr Michele GUERNELLI	President
Mr Marco D'ORAZI	Judge
Ms Silvia ROMAGNOLI	Judge-Rapporteur

Delivers the following

JUDGMENT

In the first instance civil case number 1667/2019 brought by:

VEMA INDUSTRIES S.P.A. (Tax code 00337600340), represented byomitted, with service address at(omitted)

CLAIMANT

against

ROSATI S.R.L. (Tax code 00465940013) and **ANDREA TOFFALI** (Tax code TFFNDR76H10E349R), represented by(omitted)

CHRISTIAN ORLANDI (Tax code RLNCRS76E30G337G), represented by(omitted)

DEFENDANTS

SUBJECT MATTER: INDUSTRIAL PROPERTY RIGHTS AND UNFAIR COMPETITION

.....(omitted)

FOR THESE REASONS

On the claim brought by VEMA INDUSTRIES S.P.A. against ROSATI S.R.L., owned by ORLANDI CHRISTIAN and TOFFALI ANDREA, whose claim form was served on 1.2.2019, the Court, having dismissed all other requests, allegations and objections, gives the following final decision:

DECLARES that VEMA INDUSTRIES S.P.A. lacks capacity to bring legal action against ORLANDI CHRISTIAN, limited to the claim under paragraph 10, letter a) of the claim form;

CONFIRMS and DECLARES that ROSATI S.R.L., with the participation of ORLANDI CHRISTIAN, has since year 2016 engaged in unfair competition practices as defined in article 2598 no. 3 of the Italian civil code to the detriment of VEMA INDUSTRIES S.P.A.; such practices consisted in diverting existing clients of Orlandi Radiatori S.r.l. (subsequently VEMA INDUSTRIES S.P.A.) and illicitly using proprietary know-how of Orlandi Radiatori S.r.l. (subsequently VEMA INDUSTRIES S.P.A.). To this purpose,

PROHIBITS ROSATI S.R.L. from promoting and supplying, directly or through third parties, aluminium radiators with plate bar technology to the following companies:

ROSTSELMASH, MERLO, MANITOU ITALIA, BOBCAT FRANCE, DIECI, JUNGHEINRICH MOOSBURG, HIMOINSA, DEUTZ CORPORATION, REFORM-WERKE BAUER, ANTONIO CARRARO, SDMO INDUSTRIES, MAGNI TELESCOPIC HANDLERS, BCS, AIR POWER, IML MOTORI, GIANNI FERRARI, ZETOR TRACTORS, TECNOGEN, ALFRED KAERCHER, WIDEMANN, MAFI TRANSPORT-SYSTEME, SAME DEUTZ-FAHR ZETELICE, JOHN DEERE-USINE DE SARAN, PELLENC, PERKIS PACIFIC, STILL, TEREX OPERATION, GEMINIANI, ELCOS, STORTI;

HOLDS that ROSATI S.R.L. shall pay the sum of € 500,00 for every violation of the above prohibition that should be found after the date of issuance of this judgment;

ORDERS that the operative part of this judgment shall be published on the home page of ROSATI S.R.L.'s website for a period of 3 months as of the date of issuance of this judgment, as well as on three consecutive issues of the trade magazines "Macchine Agricole" and "Macchine Edili" (both published by Tecniche Nuove S.p.a., Milan) and three consecutive issues of the magazines "Diesel Progress International" and "International Construction"; such publication shall be edited by VEMA INDUSTRIES S.P.A. with costs to be jointly and severally borne by the losing parties ROSATI S.R.L., in the person of its present legal representative, and ORLANDI CHRISTIAN;

ORDERS ROSATI INDUSTRIES S.P.A., in the person of its present legal representative, and ORLANDI CHRISTIAN, to jointly and severally pay damages to compensate for the harm suffered by VEMA INDUSTRIES S.P.A., assessed at(omitted)

ORDERS ROSATI INDUSTRIES S.P.A., in the person of its present legal representative, and ORLANDI CHRISTIAN, to jointly and severally reimburse VEMA INDUSTRIES S.P.A., in the person of its present legal representative, the costs of the proceedings, assessed at(omitted)

.....(omitted)

So decided in closed session by the Business Section of the Court on 3.11.2023.

The Judge-Rapporteur
Ms Silvia Romagnoli

The President
Mr Michele Guernelli



your cooler

VEMA
industries

www.vema-industries.com

As a manufacturer of outboard marine engines, Suzuki is continuing to release improvements to existing tech, while adding new sustainability features. By **Julian Buckley**

PERFORMANCE & GREEN TECH IN HARMONY

Suzuki Marine GB offers a broad catalogue of outboard engines suitable for virtually any application. Ranging from single-cylinder units through to V6 models, the engines are used with all types of leisure craft and commercial vessels.

“We’ve got marine engines which range in power output from 2.5 to 350 horsepower,” says Mark Beeley, head of Marine & ATV at Suzuki GB, who spoke with Power Progress International at the Seawork 2024 event in Southampton, UK. “The engines are technically advanced, which makes them cleaner and greener.”

CLEAN ENVIRONMENT

Suzuki is now building up its range of new, third-generation four-stroke engines – the company no longer offers two-stroke models in Europe. The latest of these are the DF115 BG and DF140 BG, which use a fly-by-wire control system.

Beeley says that these engines are the first to feature a microplastic collection device as standard. “It’s part of the Clean Ocean Project, which Suzuki has been running for about 15 years. There’s a collection filter on the exit of the water cooling circuit, this captures the microplastics. The unit is about the size of an egg cup; it gets filled after about 30 or 40 hours of operation in UK waters. When it’s full, the system will divert to using a bypass valve.”

A flap on the engine cover allows easy access to the filter element, which can be unscrewed and emptied. Beeley says that analysis of the collected material has shown that it is about 80% plastic.

Ultimate Boats M-CLASS vessel



The dual propshaft has two smaller propellers which deliver similar power as a larger unit, without the drag”

MARK BEELEY,
Suzuki Marine GB

Ribcraft Fisheries
Patrol vessel featuring
twin four-cylinder
DF175AP engines



With a laugh, he adds some further wisdom: “Don’t empty it over the side of the boat!”

While having a fuel-efficient engine is key, he says that the company is looking for other ways to clean up the oceans. Every Suzuki operation around the world is obliged to take one day each year where the respective team will go and help to clean up a beach, removing all the rubbish. Even the shirts the team were wearing on the Suzuki stand at Seawork 2024 are made from recycled plastic. Asked if they’re comfortable, Beeley replies: “It’s great! And you don’t have to iron it.”

ENGINE DESIGN

Beeley says that the Suzuki marine engine lineup is largely the same around the world, apart from those regions which offer a two-stroke model. Engines with an output up to 30 hp are manufactured in Thailand, while all others are assembled at the plant in Hamamatsu, Japan.



While a standard outboard engine design would require the complete unit to be mounted off the stern of the boat, Suzuki has developed a different setup. This involved moving the engine block forward and using a gear mechanism fitted in that space to drive an off-set driveshaft. The setup means that the transom supports more of the engine weight, improving the vessel's overall balance.

“This design allows boat builders to specify a larger engine, because [the design] helps to reduce the lever effect,” says Beeley.

Continuing, he describes how the 300, 325 and 350 V6 GEKI series engines (where the

Japanese word ‘geki’ translates to ‘parting of the seas’) have a dual propshaft setup, with one inside the other.

“If you make a larger engine, that weight will have a negative effect on the overall benefit,” explains Beeley. “It’s the same with large and small propellers; a large one will deliver more power, but also create more drag. The dual propshaft has two smaller propellers which deliver similar power as a larger unit, but without the drag.”

In addition, the two propellers are counter-rotating, which helps to reduce the transverse thrust of a single large prop. This increased power delivery also helps to get the hull ‘on the plane’, reducing the time the boat has its full hull in the water, where the increased drag would clearly use more fuel.

FUNCTIONALITY AND DEPENDABILITY

Moving back to look at single-propeller engines, those with outputs ranging from 150 to 300 horsepower include a feature known as selective rotation. Where most engine manufacturers have dedicated right- and left-hand units for a twin-engine boat, Suzuki avoids this by incorporating this adaptable feature.

With this system, each engine has a plug which can dictate the rotational direction of the propeller. The setup means Suzuki uses a single engine unit to support twin-engine applications. “It’s easier for the customer, especially for fleet operators; they only need to have one engine type as a backup. And the gearbox is more robust as they are designed to support running in both directions,” says Beeley.

As for maintenance, he says that like most manufacturers the marine engines can operate for about 100 hours before needing a service. “It’s a harsh environment, regular servicing really does help to extend the life of the engine. We’ve had some units which have delivered upwards of 20,000 hours of service, which is quite spectacular.”

All engines produced by Suzuki use petrol as fuel. Asked if there are any plans for a petrol/ electric hybrid, Beeley has a matter-of-fact

response. “You need a lot of power to get through the water and when you’re out at sea, you need to know you can get back. Having dependable technology is critical to customer safety, so it’s unlikely we’ll look to use these types of complicated solutions.” **PPI**

Suzuki GB unveils new DF250 KURO

The latest marine engine to be launched by Suzuki GB is the DF250 KURO. The Japanese word ‘kuro’ translates to ‘deep black’, which is the exterior colour of the new engine.

The 4.0-litre 24 V V6 DF250AUNX features new electronic mapping which has allowed peak engine speed to be increased from 5700 to 6000 rpm. In addition, reworked air intake louvres deliver more air to the engine, helping to cool the engine as it gains speed.

Other changes include a redesigned lower unit which now incorporates design features taken from racing outboards to improve cruising performance and reduce cavitation. The skeg (protective propeller shroud) now features ‘left/right asymmetry’, essentially a curve which delivers improved manoeuvrability at low speeds. Upper clamp brackets now use stiffer bushings to increase stability at speed.

The DF250AUNX, which is available for single-engine installations, uses the Suzuki drive-by-wire throttle system, auto trim, keyless start and Lean Burn tech.



Suzuki DF250 KURO PHOTO CHRISTOPHE PONCHANT, POWDER POINT MEDIA

NEW DIRECT INJECTION OF LIQUID E-FUELS

Marco Coppo, CTO at OMT, presents the test results of a new direct injection system for four-stroke engines using ammonia fuel. By **Roberta Prandi**

Fuel injection specialist OMT (Officine Meccaniche Torino) has announced the development of a new single-fuel high-pressure direct injection system (HPDI) specifically for four-stroke marine engines using ammonia. But in addition to that, the company's chief technology officer, Marco Coppo, pointed out that the solution is also compatible with methanol.

"The system builds on our experience with diesel fuel and has been redesigned for operation with e-fuels, particularly ammonia," said Coppo. "Testing of the single-fuel injector up to 1300 bar has been carried out in cooperation with Austria-based Large Engine Competence Center (LEC) for

design robustness, spray and mixture formation and combustion concepts."

The injector was tested on a single-cylinder engine (250mm bore, 320mm stroke) at 750 rpm.

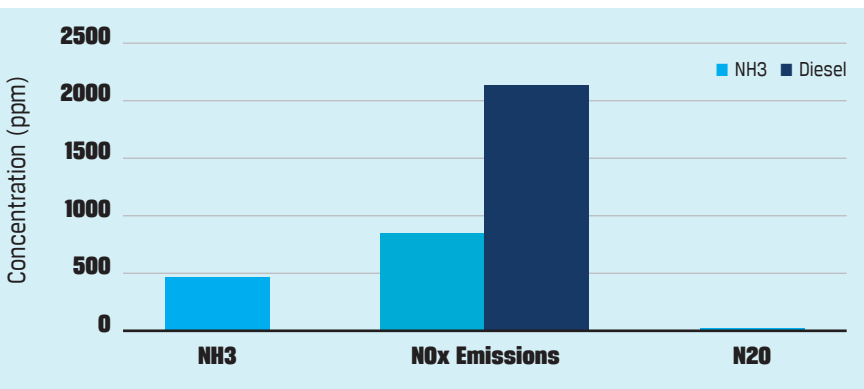
"Ammonia has less than half the heating value of marine diesel oil. Therefore, to get the same power output you need to inject more than double the amount of ammonia than diesel on each engine cycle," he explained.

Because of this characteristic, the ammonia injector must be capable of delivering those larger fuel volumes, yet still fit in the cylinder head like a diesel version. Together with the challenge of completing a compact design which incorporates the larger fuel galleries and bore holes, another major challenge was to include safety features, including a leak detection function.

This volume requirement demanded a complete rethink of the injector layout, supported by additive manufacturing and advanced production techniques.

"Safety is an issue with ammonia. As it's a toxic fuel, the design of the

Ammonia and NOx emissions comparison with direct injection for ammonia and diesel combustion



injection system needed to incorporate a flushing device to evacuate remaining fuel before inspection or maintenance," said Coppo. "A leakage detection system is also necessary to prompt the immediate switch to diesel operation if necessary."

MATERIAL CHANGES

Using ammonia also presented some material challenges, including the use of elastomers compatible with the fuel, together with those materials which might be used during production and end-of-line testing. In one case, perfluorelastomer FFKM has been used for the O-rings, as this material is also compatible with methanol and diesel fuel.

The caustic nature of the fuel also needed a different metal: "Ammonia requires the use of stainless steel components, but this material is less versatile in coping with the stresses within the injector," explained Coppo. "Injector parts coming in contact with the fuel need to be resistant to fatigue loads due to pressure pulsations and thermal shocks but, at the same time, have a high surface strength to withstand impact loading and high



To get the same power output you need to inject more than double the amount of ammonia than diesel on each engine cycle"

MARCO COPPO, OMT

New fuel injector from OMT

contact pressure, a characteristic that usually requires a surface heat treatment. However, classical methods such as nitriding and case hardening reduce the stainless benefits of the steel."

As a result, work was done during the injector design phase to limit loads and stresses on the material. On top of that, stainless steels were sourced which offer the same resistance to mechanical loads as steels normally used to produce injectors.

Elsewhere, to avoid friction due to low lubricity and valve seat damage caused by low hydraulic damping, OMT applied diamond-like carbon coating (DLC) on moving elements, together with a soft-landing needle design.

EXTENDED SERVICE LIFE

To ensure a long service life, the injector must feature continuous cooling of the nozzle. Coppo noted that this requisite stems from the need to operate with diesel as a backup for when ammonia is not available. "When diesel is used, the ammonia injector is closed but still gets heated by the diesel combustion. When the system is moved back to

ammonia, the fuel in contact with the hot nozzle vaporizes and that creates a thermal shock which can damage the components, which is reduced by injector cooling."

Tests by LEC showed that the injector can reach up to 95% ammonia operation at full load, with pilot diesel injection making up the remaining 5%.

Measured emissions showed less than 500 ppm ammonia slip using the high-pressure direct injection unit from OMT, significantly lower than with indirect injection and premix combustion. Emissions of NOx were 60% lower than with diesel operation.

The HPDI injection system is now ready for testing, although customer field tests will take a couple of years. This is largely due to installation onboard a ship, together with fuel storage and treatment safety systems. Availability of ammonia will could also impact testing timeframes.

Coppo is anticipating OMT to start work on a dual-fuel injector solution for use with larger engines above 600 kW per cylinder. The design will be comprised of two nozzles, one for each fuel type, with both integrated into the same body.

As for possible adoption of e-fuels in the maritime industry, Coppo explained that ammonia is expected to be first utilized onboard ocean-going ammonia carrier ships fitted with two-stroke engines. These will use a portion of the cargo as fuel, reducing required fuel storage space. Other advantages include rapid amortization of the technology investment, better decarbonization due to the high engine power, and reduced safety concerns than with a passenger vessel.

Looking at four-stroke marine engines used on shorter sea routes, the adoption of ammonia as a fuel will likely take longer due to issues including distribution and local availability.

Methanol fuel is also likely to be adopted on local sea routes. This will be supported by production of biomethanol from feedstock and biomasses, with availability expected across Northern Europe and Scandinavia.



BOOST YOUR SHIPS WITH BEM L-SERIES

Tailored Solutions for Every Type of Vessel.



L05 L08 L11

Marine Certified –
Protection class IP 23/44/54/55



THE L SERIES RANGE

L05 - L12

Power 260 - 9000 kVA | Speed 500 - 1800 rpm

Visit us at **SMM 2024, Hall A3, Stand 214**. We look forward to seeing you!



COLLABORATION EMPOWERS MARITIME DECARBONIZATION

Through ongoing collaboration with stakeholders, Siemens Energy delivers integrated electric systems optimized to each vessels' needs. By **Becky Schultz**

As a 30-plus year military veteran who spent his career designing, constructing, operating, maintaining and fixing vessels of all types – aircraft carriers to submarines – for the US Navy, Retired Rear Admiral Bryant Fuller, who now heads up Federal Maritime Programs for Siemens Energy, knows a thing or two about powering a ship.

“Designing a power system for a ship is a very collaborative and iterative process,” he said. “There is a lot of back and forth. [A ship] is a system of systems and what you do over here will impact what happens over there. Nothing is done in a vacuum.

“There’s a lot of implications for going with one type of technology or one type of fuel compared to another,” he continued. “There’s not a single best answer.”

Coming up with the optimal solution to power a vessel requires working with all stakeholders – the owner, naval architect, engineers, shipbuilder, etc. – to set parameters and priorities. “There are trade-offs,” Fuller said. “There’s not a magic bullet out there because everything impacts something else.”

DIVERSE SOLUTIONS

Siemens Energy was spun off from German multinational technology conglomerate Siemens in 2020. Its portfolio encompasses a diverse collection of products, from electrolyzers and large gas and steam turbines for power utilities to technologies for the electrification, automation and digitalization of offshore and maritime applications.

The company provides solutions to meet varying customer needs based on power

requirements, vessel size, application, time at sea, sustainability initiatives, etc. These solutions include low-voltage power generation, PEM fuel cells, battery energy storage systems, waste heat recovery systems and more.

“We provide integrated electric systems. For the marine side at least, we don’t make diesel engines,” Fuller noted. “So, we’re kind of agnostic on diesels... and the fuel that you burn in your prime mover.

“Now we’re very interested because that is a key part in providing the propulsion system for a ship. The parameters of the ship matter. But we’re not the decision makers for what kind of [engine or] fuel you’re going to use.”

COLLABORATION REQUIRED

“We need to understand what the operator’s requirements are – what’s important to them. Does this vessel need to have a certain range? Does it have to have a certain degree of reliability?” Fuller pondered. “There’s a lot of operational factors that drive the whole design.”

Both the build and operational costs must also be taken into account. “You have to understand what the customer’s budget is. Even if it’s a Navy vessel or research vessel that’s operated by [some] quasi-government or government agency,

Edda Freya, a battery-hybrid offshore vessel, employs Siemens Energy’s BlueDrive PlusC propulsion system and BlueVault energy storage system

PHOTO: SIEMENS ENERGY



there are still limits on their budgets,” Fuller emphasized.

Being brought in early can make all the difference. “Sometimes we get brought in upfront and early with the naval architecture firms, then build the system,” said Fuller. “Sometimes [they] already at least think they know what they’ve got and say, ‘Hey, go build this.’”

“A lot of times, if they haven’t had somebody like us or even our competitors to advise them, they might not have got it exactly right. But most of them know their limitations... They’ll give you a basic solution, and then you go help them refine it and come up with a better solution.”

LVDC ADVANTAGES

One of the more prevalent solutions finding its way into a growing number of smaller vessels is Siemens Energy’s BlueDrive PlusC power and propulsion system. This low-voltage direct current (LVDC) system incorporates purpose-built, brushless and synchronous variable-speed generator sets designed to deliver a range of frequencies and voltage for diesel, dual-fuel or gas-operated vessels.

BlueDrive PlusC utilizes a power management system to control the engines to achieve optimal speed set points based on torque capability. According to Siemens Energy, this reduces fuel consumption by regulating speed, adjusting the lineup of engines as necessary and operating the engines as minimally as possible.

“The LVDC technology with variable-speed generators was developed over a decade ago for mainly offshore vessels that needed to have



SOURCE: GLOSTEN

Proposed conceptual rendering of the new Scripps CCRV, which is set to become the world’s first hydrogen-hybrid research vessel



PHOTO: SIEMENS ENERGY

Siemens Energy will be providing its BlueDrive PlusC variable-speed diesel-electric propulsion technology for the Canadian Coast Guard’s new Multi-Purpose Vessels (MPV). The MPVs will be constructed at Seaspan ULC in Vancouver with first delivery scheduled in 2030

high reliability and minimize their operational costs,” said Fuller. “We’re using variable-speed generators to [enable] just enough power coming out of the diesel to provide the power that you need.”

A traditional diesel generator typically runs at top rated speed regardless of the load. “So, you’re pushing a lot of fuel to the injectors that is not getting burned efficiently,” he said. “[With the variable-speed gen-sets] if the diesel is at 30% load, then it’s operating at a lower rpm and lower power level and you’re injecting less fuel into it. So you’re saving fuel.”

According to Fuller, a number of vessel operators are seeing 20% to 30% less fuel burn with the LVDC solution. They are also seeing reduced engine wear and tear.

“Some of our operators are telling us they’re doing 20% less diesel maintenance, which is a big operational expense,” Fuller noted. “[Others] are telling us they’re eliminating an entire top-end overhaul on some of their diesels because of the way they’re operated. So, for them that’s a huge operational savings.”

Other benefits Fuller cited include a smaller footprint, fewer components and a lighter weight compared to a traditional constant speed AC integrated electrical system.

The BlueDrive PlusC can also be combined with the BlueVault Energy Storage System, which uses an advanced lithium-ion battery to store surplus power while the vessel is in operation and dispatch it on demand. Such a system can provide redundancy in the event of a system “casualty.”

“You have a battery that can basically replace a full diesel generator until you can start another one,” Fuller explained. “The battery picks up the



load and then a couple of minutes later, you get another diesel online and life is good again.”

WORLD-FIRST HYDROGEN HYBRID

Currently, Siemens Energy has roughly 60 vessel references throughout the US, with a sizable portion utilizing LVDC technology. The company has also started a project with the Canadian Coast Guard using LVDC in a multi-purpose diesel-electric vessel.

But perhaps the most notable project that Siemens Energy is involved in is for the Scripps Institution of Oceanography at UC San Diego. Scripps has commissioned a new coastal-class research vessel (CCRV) set to become the world’s

PHOTO: SIEMENS ENERGY



Siemens Energy provided the water-cooled battery system for this Norwegian all-electric ferry, said to be the world’s largest electric ferry

first hydrogen-hybrid research vessel.

The CCRV’s hydrogen fuel cell-based propulsion system will work in tandem with a low-voltage DC diesel-electric power plant that will provide supplementary power for longer missions. For 75% of its operations, however, the CCRV will rely entirely on hydrogen for propulsion.

“For them, it was very important for zero emissions,” said Fuller. “Hydrogen is the way you can do that... We sized the hydrogen plant and the power systems so that 75% of the time, at least from the tank to the wake, they’re carbon free.”

INTEGRATED ELECTRICS

The design of the hybrid CCRV is being led by naval architecture and marine engineering firm Glostten, with Siemens Energy as electrical integrator and Ballard Power Systems and Chart Industries selected as primary hydrogen equipment vendors. The integrated electric system provided by Siemens Energy includes the BlueDrive PlusC LVDC along with a BlueVault Energy Storage System.

“We have a very small energy storage package on there so the ship can get underway. It has three small diesel generators powering up the LVDC system,” Fuller explained. “We have 1.2 MW of fuel cells on it [provided by] Ballard, a fuel cell company out of Europe, and a 1,200-kg cryogenic hydrogen tank, which Chart Industries [is providing].”

With the initial design cycle recently completed, shipyards will be invited to bid for the build; the goal is to select the shipyard to build the vessel over the remainder of this year.

PPI



YOUR COOLING SOLUTION COMES FROM OUR ENTIRE TEAM

FEEL CONFIDENT IN OUR HANDS

Our Team places the customer needs at the centre of the product development through to the production phases, in order to deliver a very effective and efficient performance from both our Standard and Customised Cooling Systems. Our highest priority is to establish a preferred supplier relationships with our valued customers.



IMAGINE WHAT'S POSSIBLE WHEN YOUR MACHINERY CAN CONQUER ALL CLIMATES



Whether your machinery is crushing, drilling, excavating, earthmoving, material handling, transporting or trenching, finding the right thermal management system to deliver exceptional performance in challenging conditions is critical.

From shock and vibration to dust, debris and extreme temperatures, Grayson has been developing advanced heating and cooling systems that conquer the thermal challenges of leading global OEMs for over four decades.

From liquid chillers for battery temperature regulation and coolers for electric traction and hydrogen fuel cells, to HVAC solutions using the latest, ultra-efficient heat pump technology, Grayson are here to support you create the next-generation of emission-free off-highway vehicles and machinery.



Contact Grayson to conquer
your thermal challenges today

Power Progress International

visits a series of companies across Spain to discover how they are adapting to new market challenges



QUALITY

In 2022, the then *Diesel Progress International* published a report based on a tour of various machine and power companies across Spain. At that point in time, these industries were only beginning to emerge from the effects of the COVID pandemic and related part supply issues caused by national lockdowns. Now, two years later, *Power Progress International* has returned to Spain to find out how the market is performing, while taking the chance to see some of the latest tech now in development.

EUROPEAN PRODUCTION

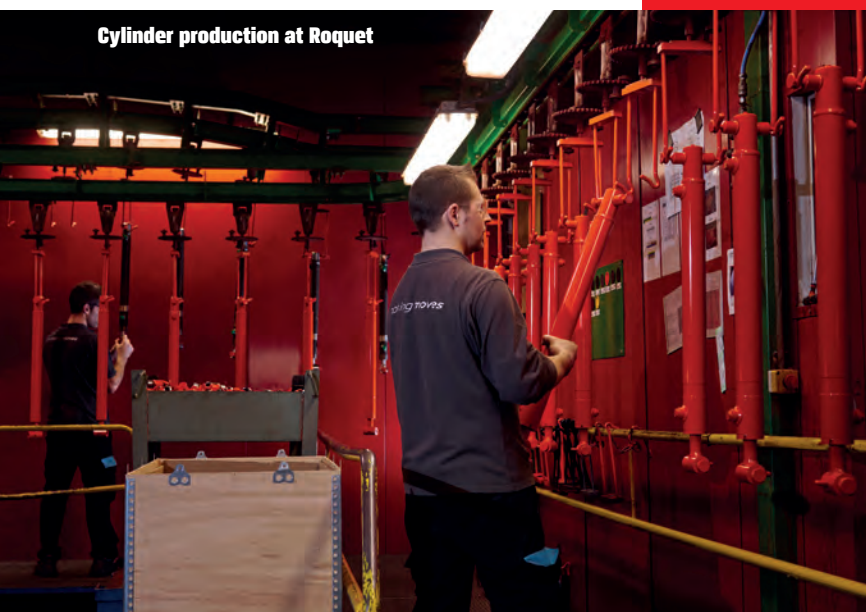
Roquet Hydraulics, which has its headquarters in Tona, near Barcelona, specialises in the design and production of gear pumps, cylinders, motors and valves for hydraulic systems used across mobile machines and agricultural applications. As part of this, the company also has testing facilities to determine such issues as part fatigue and corrosion resistance, while offering advice on best manufacturing practices.

Close to the company headquarters, a plant

Produced with support from ICEX, the Spanish Institute of Foreign Trade, and ANMOPYC, the representative organisation in Spain for companies delivering technologies for the construction and mining industries



Cylinder production at Roquet



in Centelles manufactures a broad range of cylinders for hydraulic applications. Operated under the Dinacil brand (part of the Roquet company portfolio), the parts are used in construction and agricultural machines, plus a series of other industrial applications.

All parts for the cylinders are produced in Europe by Roquet; Dinacil has a sister plant in Romania which also produces cylinders. With that in mind, it's surprising to learn that Roquet has no current, or indeed any future plans to start production in China.

"We hear that question all the time at trade shows, 'do you make the parts in China?'" says Ruth Martinez, from the Sales and Marketing department. "[In China] they have very big facilities, they have the machinery, the people. But everything we produce is made in Europe and where possible, manufactured in-house by Roquet. Competitors make their parts in China and there's a not inconsiderable price difference, so we sell on the quality of our products."

Such is the focus on quality that it can take anywhere up to two years to bring a new cylinder

WHERE IT COUNTS



All Roquet products, including pumps such as this, are produced in Europe



design to market. Once in production, a 100% test cycle ensures that each finished unit is ready for a long working life in the field.

Roquet also operates a series of part warehouses around the world. According to Martinez, these help to support timely delivery of components to OEMs, while also assisting with the company's customer service offering. "If you look at our warehouse location in Thailand, it's delivering to a lot of local customers. But it also helps that if a component in the field has a problem, we can quickly identify and source a replacement."

This tour of Spain went through Pamplona, home to the famous bull run



Competitors make their parts in China and there's a not inconsiderable price difference, so we sell on the quality of our products"

RUTH MARTINEZ,
Roquet

Roquet has recently opened an office in the United States. While the location will look for new opportunities, Arnau Bellapart, director of Business Development, says that the primary objective is to support existing customers. He says that a lot of European companies with US operations have continued to use Roquet parts and the new office will help to deliver the same level of support as in Europe.

"We have to be close, so we can address any issues or advise on specification. With this new location, we'll be able to offer the same supply timetable as in Europe," he explains. Moving forward, it's likely that some limited production will take place in the US, at least for less-customised volume parts.

Roquet was not originally a component supplier. Instead, the company's origins can be traced back to a foundry producing parts for other component manufacturers. The foundry site now delivers about 30% of its output to Roquet, while much of the remaining capacity is offered to the wider market, including other hydraulics manufacturers.

Whether volume or custom, quality is still the primary driver. “Our cylinders are more expensive because we’ve integrated some high-tech features. But within that we must maintain quality – which translates to dependability, the capability of our components to complete more than half a million cycles out on the construction site,” says Bellpart.

CUSTOMER CARE

Quality also plays a key role in production at Dicsa, a specialist provider of hydraulic hoses and fittings. The list of suppliers delivering to Dicsa is a ‘who’s who’ of international hydraulics.

“In many cases, we act as the warehouse for our customer,” says Pilar Marin, media manager. “We can manage their stock, deliver the part volumes as and when they’re needed.” In addition to the site in Zaragoza, which has 215,000 square feet (approx. 20,000 square metres) of warehousing space, Dicsa now also operates similar locations in Italy, Germany and the US.

Dicsa also manufactures some of its own stainless steel fittings. Marin: “We’ve always been very customer oriented. So in the 1990s, when we had problems fulfilling some requests, we started the factory so we could deliver the parts our customers needed.”

3D printing is used to produce prototype parts, as Sergio Miguel, product manager at the Zaragoza location explains. “Before setting up a machine for a production run, we can deliver samples that are signed off by the customer. It saves a lot of time and money.” Parts can be customised to such a degree that even the helix



of a screw fitting can be altered to better suit the application.

Moving through to the production halls, Miguel says that each area produces parts of same type and size, helping to reduce switchover times. “A single machine incorporates a series of stations to complete different processes, resulting in the final component. We also have assembly operations to combine different parts; some are manual, others are 100% automated.”

Miguel explains more about testing of the final parts. “We generally use 316L steel, the low-carbon grade is critical to part longevity. We can test the grade, the composition of the steel, using a spark test. The machine fires a spark at the material and the resulting wave can be analysed to determine the composition, the percentage of carbon, chromium and other elements.”

POWER EVOLUTION

A short journey across the sun-drenched countryside surrounding Zaragoza brings us to Carod, a company which originally focused on powered pumps for agriculture and fire protection, but now delivers a range of generator sets, high-pressure washers and pneumatic compressors.

“The original plant was about 11 kilometres from here, but in 2011 we purchased this land and built this new headquarters,” explains Mohamed Mohinah, export manager. He adds that while such parts as the steel gen set closures are currently delivered by suppliers, there are plans to extend the facility and produce those in-house. “COVID was hard on our suppliers

Carod's Mohamed Mohinah



It's another result of COVID. We hold engines so we can quickly fulfil customer orders”

MOHAMED MOHINAH,
Carod



Dicsa uses Spectromax machine to check steel composition, including carbon levels



Engine inventory at Carod supports quick customer fulfillment



Gerardo Carod, commercial manager

and lead times grew to nearly one year. So we'll setup our own production to avoid any repeat of that."

Since the completion of the new factory, Carod has been steadily ramping up the power output of its generators. "We've gone from about 250 kVA to 800 kVA," says Mohinah. "We've got upcoming projects which will include our first 1 MW gen set." He adds that the production split at Carod is about 60% gen sets, with all other products making up the remaining 40%.

Power for the generators comes from a range of suppliers, including Deutz, Volvo Penta, FPT, Honda and Kohler. In addition to these usual suspects is MWM International, part of the Navistar Group, which has its headquarters in Sao Paulo, Brazil. "MWM engines are all mechanical, no computers. That makes them very reliable, very rugged."

Around the assembly hall, shelving units house hundreds of boxed engines. Mohinah says that they have more than \$6 million in engine inventory. "It's another result of COVID. We hold engines so we can quickly fulfil customer orders. If the engine's in stock I can fulfil a gen set order in about four to six weeks." Inventory includes Stage 2, 3 and 5 engines with outputs up to 500 kVA.

Across the hall, Mohinah points out a recently-completed high-pressure water pump; this is a self-contained unit which uses an engine from Deutz, pump, fuel tank, etc. all neatly housed in a towing trailer. "This is for a customer here in Spain. These are used to control fires, but also to remove graffiti. That's very common here."

TECH DEVELOPMENT

Spain has a long history of manufacturing machines for construction, agriculture, mining, transport and power generation. But the country is also home to a series of technical institutes

and universities which, in partnership with government agencies and related groups, are looking to develop new technologies intended to improve operational efficiencies across these and other industries.

Established in 1984, ITA (Instituto Tecnológico de Aragón) is a tech centre based in Zaragoza. Working with the Department of Economy, Employment and Industry in the Aragón government, the teams there are working on projects involving clean energy production, digital agribusiness and sustainable mobility.

In one such case, a team at ITA is working on the Ephyra project, or European Production of Hydrogen from Renewable Energy. This will see a 30 MW renewable hydrogen production plant integrated with a refinery in Corinth operated by Motor Oil of Hellas. This will deliver green hydrogen to the refinery and other external users as a test case for the circular hydrogen economy.

While development of this megaproject continues, ITA is continuing to develop mechatronics systems for both on- and off-highway vehicles, as Carlos Bernad, R&D project manager at ITA explains: "We're looking at the integration of mechanics, electronics and robotics in machines with the intention of improving functionality across all areas. We're looking for synergies between these fields, focusing on how mechatronics can support robotics and vice versa. It's a little different from the standard perspective."

While work originally focused on making improvements to existing components and machines, Bernad says that being involved with a project from the start can help with delivering the most benefit in terms of functionality and performance.

In an outside testing area, Bernad presents a series of machines fitted with different autonomous driving systems. With similar systems already available, Bernad is asked what's different about those developed by ITA.

"These systems have been adapted for harsh environments and specific tasks," he says with clear enthusiasm. "With new advances in sensors and computational power they can process far more data, which makes them more efficient. The data capacity also makes the vehicles safer, they can react to dangerous situations with better decision making. The new sensors collect the data and then our algorithms use that information to make the best choice."

NEW MARKET OPPORTUNITIES

After an overnight stop near Pamplona, we travel

28 >



Carlos Bernad, ITA, explains details behind autonomous driving systems

on to our final stop of this tour in Ibarra, a small town about 30 km south of San Sebastian. Here, we arrive at Obeki, a manufacturer of electric motors which, up until now, have primarily been used in various lifting applications across construction, marine and other sectors.

“Somewhere between 80 and 90% of global production of electric motors is in low-cost countries,” says Javier Múgica, commercial director. “That means that in Europe, the business is largely based on logistics, warehousing and distribution. Obeki isn’t involved in that; instead, we provide specialised solutions with non-standard features, such as braking systems and higher torque.”

As part of this, Obeki has been looking to increase its R&D capacity, with clever product designs supporting new business opportunities. “We’re looking to develop products for demanding customers which have higher requirements than those using standard electric motors,” he states.

According to Múgica, Obeki produces about 4,200 units per annum. “This is nothing for a company in China,” he explains. But for those motors, the company develops about 700 unique designs each year. “A production run of 10 motors is not unusual for us, although some customers might even want just one unit.”

There are two benefits to such customisation. One, the motor is specific for its intended purpose, meaning that it is ideally suited to the application – and guaranteed as such. But should there be an issue, Obeki stands behind each motor it produces. “If there’s a problem, large companies will only try and sell you another motor. We will save money and time, where possible, by fixing the motor already in place.”

Building on this expertise, Múgica says that the next step is to broaden the number of markets using Obeki motors. “We’re now working on projects which capture renewable energy from the oceans. Our motors are part of systems which collect energy from waves.” This requires not only peak motor efficiency (based on material choice and design) to minimise energy loss, but also rugged hardware which can withstand the harsh conditions.

These energy collection systems are still in the prototype phase. But with investigations into the tech happening in Spain, the UK and Australia (amongst others), the goal is to create a network of companies capable of delivering a regular supply of related components.

Based on this Múgica says that Obeki has plans to provide motors for applications with



Motor assembly hall at Obeki; output is about 4,200 units per annum

conditions which are even more savage. “Nuclear plants have motors powering various functions, fans and pumps for cooling systems, etc. If they are near the reactor vessel, they must be certified to withstand a variety of circumstances, such as an earthquake, and use materials which will not decay due to the radioactivity. We would like to get involved in developing sophisticated motors for this type of application.”

CHALLENGES REMAIN

As China has grown into its role as the lead global location for volume production of machines and components, European companies in the same business sectors have been forced to find unique selling propositions beyond basic low cost by which to attract and retain customers.

It’s apparent over these visits that the challenges presented by COVID and the subsequent supply chain issues are now coming to an end – at least in one case, a larger inventory now serves as a production buffer. But while the effects of the pandemic fade, new challenges will require constant monitoring and implementation of agile solutions.

In each of the cases outlined in this article, from Roquet through to Obeki, the companies have managed to maintain (or grow) market share by leveraging requisite expertise in a specific business area, whether that is quality, customisation or customer service.

It’s a self-evident truism that there will always be a market for cheap solutions. But in cases where a part is needed as soon as possible, where quality (and guaranteed uptime) is a must, or a new solution needs developing to suit a specific application, a more responsive company is likely to be the best choice.



“We provide specialised solutions with non-standard features, such as braking systems and higher torque”
JAVIER MÚGICA, Obeki

COUNTDOWN TO **CARBON ZERO** IFM DECARBONIZATION PATHWAY



DISCOVER OUR DATA CENTER ENERGY SOLUTIONS

Discover our prominent choice for mission-critical installations. The V170 DCC Series of industrial diesel engines is our answer to the growing demand for continuous electrical supply application for Data Centers. Made with power ratings defined in accordance with ISO 8528-1:2018 those applications that require maximum reliability and duration, in any climatic condition. HVO Compliant to reduce the CO₂ emission, STAGE-V & DCC Compliant (Emission Compliant EU 2016/1628; DCC ISO 8528 G3)



DISCOVER MORE ON
energy.isottafraschini.it

in f y



enilive

Isotta Fraschini Motori
a FINCANTIERI company

Neste is currently the world's largest producer of HVO (hydrotreated vegetable oil), or as it is known in North America, renewable diesel. The fuel is a drop-in replacement for fossil-derived diesel, so much so that a series of major engine OEMs have already approved HVO/renewable diesel for use in their diesel models. In addition to that flexibility, renewable diesel offers a series of benefits over its crude oil-derived cousin – but more on that later.

GLOBAL FOOTPRINT

From its headquarters in Espoo, on the western edge of Finland's capital, Helsinki, Neste now operates four refineries around the world: Porvoo, located to the east of Helsinki; in Rotterdam, The Netherlands; in Singapore; and a joint-venture operation in Martinez, California.

“We have an annual nameplate capacity of approximately 5.5 million tonnes,” says Carrie Song, senior vice president, Renewable Products, at Neste, who spoke with *Power Progress International* in an exclusive interview. “We're investing about \$1 billion to expand production capacity at our Rotterdam site and, together with other capacity investments in Singapore, we are projecting that we will reach annual

Neste fuel refinery
in Singapore



RENEWABLE DIESEL GAINS MARKET MOMENTUM

Neste's **Carrie Song** speaks with **Julian Buckley** about production, distribution and the market growth potential for renewable diesel – or HVO, as it is known in Europe



Neste MY Renewable Diesel



West coast supply

Some industry commentators have noted that while renewable diesel and HVO offer a route to reducing the internal combustion engine emissions, it is availability of the fuel – or the lack there of – which makes it difficult to achieve any advantage.

Carrie Song states that as the customer acceptance level has increased, Neste has developed a "strong customer base" for its renewable diesel product. Regions where there are refineries and early adopters of the fuel have seen it achieve some noteworthy market penetration: "It used to be a small player, but in California more than 50% of the diesel pool is now made up of renewable diesel."

She says that the Low Carbon Fuel Standard put in place by the California Air Resources Board has played a sizeable role in convincing customers to use renewable product. There are now pilot programs in Oregon and Washington, with associations in other states, while some Canadian provinces are also looking at supporting wider supply of renewable diesel.



“We have fully-owned companies focused on locating and collecting feedstock”

CARRIE SONG, Neste

(such as renewable naphtha) used in the polymer and chemical industries.

Asked about emissions from the production of renewable diesel, Song explains: “We don’t look at the GHG (greenhouse gas) emissions from specific steps like production or tailpipe emissions. Instead, we have an end-to-end approach, looking at how emissions are reduced across the product lifecycle. This is particularly important when looking at older engines. The benefits, the improvement in air quality and reduction in particulates when using renewable diesel in an older engine, these are proportionally higher.”

SOURCING FEEDSTOCK

As might be expected, identification and collection of the raw feedstock is a major hurdle to efficient volume production of renewable diesel. While geopolitical upheaval plays a significant role in setting the price of fossil fuel, feedstock availability is a primary driver in renewable diesel prices.

“We believe there are ample feedstock sources,” explains Song. “There are existing sources and we’re always looking for new streams. In addition, we’re looking to streamline the collection process, make that more effective. We have fully-owned companies focused on locating and collecting feedstock.”

In addition to these known streams, R&D teams at Neste are continuing to look for wholly new sources. Song says that forestry waste is one area of interest, while production based on algae is also under investigation. “It comes down to having the resources to maximise collection opportunities, while also expanding the potential pool of possible candidates,” she explains.

Neste declined to offer specific numbers

production of 6.8 million tonnes (approx. 2.3 billion gallons) of renewable products by the end of 2026.”

Asked about the range of products now manufactured by Neste, Song starts by explaining that Neste produces renewable diesel – not biodiesel. “They’re two completely different products,” she says with conviction. In addition to HVO/renewable diesel, the company also produces SAF, or sustainable aviation fuel, while a third product range includes feedstocks

The circular economy of renewable diesel



covering the volume of feedstock needed to produce a given quantity of renewable fuel. That is because the different feedstocks can deliver different volumes and quoting figures based on a single feedstock type would not give an accurate estimate of anticipated results.

FUEL STABILITY

Going back to the benefits of renewable diesel, the final product is reported to be far more stable than fossil diesel or biodiesel. According to Song, the chemical properties of the renewable diesel mean it attracts very little water.

“Because of the stability of the molecules that make up renewable diesel, the product has an amazing shelf life,” says Song. “Production started about a decade ago and we periodically take samples from those early batches to check the quality. Even now, the product meets all related specifications.”

She says that biodiesel might have a shelf life of a few months, while fossil diesel remains viable for about a year. As such, the characteristics of renewable diesel mean it’s ideal for use with gen sets intended to supply backup power.

In addition, because there are no aromatics in the renewable diesel, the fuel burn is far cleaner. Less carbon buildup within the engine can support extended service intervals and reduced servicing costs, both in terms of downtime and also the need to replace filters and other components.



Fire truck being refueled at Neste fuel station in Oakland, CA

ADOPTION BARRIERS

Renewable diesel can use all the same infrastructure as fossil diesel – this extends from the national distribution pipelines which move fuel across large geographic regions, through to marine tankers, trucks and storage tanks. Due to its chemical similarity, the renewable fuel can mix with fossil diesel in any percentage combination.

“Renewable diesel doesn’t require any new infrastructure, unlike other alternative fuels,” Song points out. “If you look at hydrogen, all the supporting hardware has to be put in place, which represents a lot of investment.”

Yet despite ready accessibility in areas with the supporting distribution networks and infrastructure, renewable diesel remains more expensive than fossil fuel.

“Even with the available incentives, renewable diesel is expensive when compared to the fossil equivalent,” says Song. “I would argue that a large part of that difference is down to fossil fuel producers not incorporating the cost of the pollution generated from their product in the final retail price. We’re factoring that into the process and price, the fuel is produced sustainably and is fully traceable, so like-for-like it’s not necessarily a fair comparison.”

There’s also issues with supply and demand, which Song went on to describe: “Greater demand will play a role in cost reductions. But we also have to consider the cost if we do not start using renewable diesel, the potential impact on air quality and the environment. In my opinion, that outweighs the retail cost.”



PHOTO: ADDBESTOCK

Pipeline delivery

Neste produces the only renewable diesel product which has achieved ‘top tier’ certification. When it comes to distribution via national pipelines, the product is clearly going to mix with standard diesel – how does this affect the sustainability credentials?

“Normally, pipelines will issue a standard spec for renewable diesel,” responds Song. “The pipeline is shared, so there is a standardised product level. We’re very proud of our renewable diesel product, it has a very high specification.”

Product taken from the pipeline is certified as ‘renewable’ based on the volume of fuel added to the system. Using a mass balance system, customers can receive certification that the fuel they withdraw is equivalent to an equal volume of renewable diesel which has been pumped into the network.

RETAIL DISTRIBUTION

It might be assumed that fuel products produced by Neste are only available on a business-to-business basis and unavailable to private customers. But Song says that there are a limited number of outlets which now offer renewable diesel directly to the retail market.

“We have a really good market share in Finland, selling to retail customers,” explains Song. “We also have a series of partners in The Netherlands which have offered Neste MY Renewable Diesel since 2019.”

In the US, Neste has a series of partners which offer renewable diesel. While these are not open to retail customers - the fuel is purchased by truck drivers using dedicated cards - the program has expanded outside California to where there are now outlets throughout the Pacific Northwest.

The fuel is stored by Vopak, which operates the Vopak Los Angeles Terminal within the Port of Los Angeles. The tanks were previously used to store fossil diesel; the switch to renewable fuel has helped with Vopak’s own energy transition.

While a series of new power technologies are now making their way into the off-highway and road transport sectors, this will have little impact on the existing global fleet of diesel engines.

“We don’t expect those assets, those existing diesel internal combustion engines, to go offline anytime soon,” says Song. “From a capital investment perspective, it doesn’t make sense for a company to scrap their fleet of internal combustion-powered machines and switch overnight to a new technology.”

Then there are the applications which have very high power requirements, such as mining and marine. Song says that the expectation is that a high percentage of these will have no choice but to stick with internal combustion. Again, in these cases, renewable diesel offers a route to

off-setting emissions related to using fossil diesel.

Song follows this up by saying Neste is not against diversification of power solutions. But she adds that the given solution should be both practical and economically viable. As such, electrification (as an example) is not viewed as ‘the enemy’; instead, it’s simply one of many solutions selected on a use-case basis.

“A company should procure EVs where those a suitable,” says Song. “I expect to see continued portfolio diversification, but that should not be at unnecessary cost or impact on efficiency. Renewable diesel is just an option which supports choice.”

FUTURE CHALLENGES

A litre of fuel bought from Neste means a litre of fuel not bought from the major oil companies. Asked if this had generated any negative response to Neste’s products, Song replies that to the contrary, most oil companies are now starting production of their own renewable fuel products.

“As demand spreads [for renewable diesel], from California to the wider United States, we will need more output. That supply will create stable demand and, in turn, will give investors the confidence to support our company.”

According to Song, the setup cost of the joint-venture production site in California was around \$1 billion. As stated (see box on page 27), more than 50% of diesel product in California is now made up of renewable fuels, but the Neste joint-venture with Marathon Petroleum is still reported to be operating at just 50% of capacity.

“I would like to see more states follow the lead set by California,” she says. “Possibly supported by government policy; replacing diesel with renewable product would eliminate a significant amount of carbon emissions.”

In April of this year, New Jersey Natural Gas (NJNG) made the switch to Neste MY Renewable Diesel. Across the company’s fleet of 70 medium-duty trucks, NJNG will use 57,000 gallons (168 tons) of fuel each year. Producing 75% less CO₂ than fossil diesel (total fuel lifecycle), this is an annual emissions reduction of 550 tons. Deliveries come from Neste distributor Diesel Direct, said to be the country’s largest mobile on-site fuelling company.

Song: “We see some customers making the switch [to renewable diesel] voluntarily. But from a cost perspective, it is more difficult to promote that switch without policy support. If we want to scale up East coast expansion, it will require the government to speed up support for clean fuel products.”

PPI



It doesn’t make sense for a company to scrap their fleet of internal combustion-powered machines and switch overnight to a new technology”

CARRIE SONG, Neste



Vopak Los Angeles Marine Terminal PHOTO: VOLPAK

FAME-based biodiesel is already helping to reduce European vehicle emissions, but future market changes will likely impact production volumes. By **Julian Buckley**

THE CASE FOR

Where both are biofuels, FAME biodiesel (fatty acid methyl ester) is often confused with HVO (or as it is known in the US, renewable diesel). Although both can be a substitute for fossil diesel, there are some significant differences between the two non-fossil products.

It is the base material (biomass) and the production methodology that dictate which biofuel is produced, says Doris Matschegg, researcher for Sustainable Supply and Value Cycles in the biofuels market at Bioenergy and Sustainable Technologies (BEST). From its headquarters in Graz, Austria, BEST has been building a related resource base for more than 20 years with the intention of supporting the transition to a fossil- and carbon-free economy.

“FAME and HVO can be produced using any type of fat-based feedstock, such as UCO (used cooking oil) or rapeseed oil (sometimes called canola oil in North America). While the same feedstock can be used, the technology pathways of these alternatives to fossil diesel differ,” she explains.

“This is one of the key differences between biodiesel and HVO. Where biodiesel uses transesterification, HVO is produced using a hydrotreatment process. Transesterification removes glycerine bonds from the oil esters; the primary byproduct is glycerine. The hydrotreatment process used to create HVO is much more complex; HVO can either be produced in dedicated HVO plants or via co-processing at a standard fossil plant. In co-processing, a percentage of biogenic oil is added to the crude oil which results in a fuel with a biogenic content.”

It might seem too obvious to say that adding 10% cooking oil will result in 10% of the final fuel product being considered ‘green’ – and it certainly is. Matschegg says it’s not so easy to determine the green portion of the resulting products, which range from light fuels (kerosene, etc.) through to heavier diesel grades. “The calculation for determining the biogenic fraction is quite complex!” she adds.

BIOMASS IS GENERATIONAL

Another common misconception when looking at biodiesel is the ‘generation’ of the fuel – common knowledge says this relates to the final fuel, but instead it depends on the base biomass, as Matschegg explains:

“You can have first- or second-generation biodiesel,” she says. “When you produce biodiesel from virgin oil, such as rapeseed – a potential food source or animal feedstock – that is first-generation. When based on UCO, that’s a second-generation product.”

Moving on to examine the cost of the two competing processes, the mistake is made to call used cooking oil ‘waste’. Matschegg is quick to point out the error. “There’s already a very strong market for UCO, it’s not waste. Most related government targets require biofuels made from second-generation feedstock, so the

Biodiesel helps cut GHG emissions

According to data from the European Biodiesel Board (EBB), usage of biofuels, including biodiesel and HVO, has been helping to make sizeable inroads in cutting the total amount of greenhouse gas emissions across the EU.

Data released by the EBB shows that use of FAME biodiesel and HVO eliminated between 77

and 81% of the emissions from fossil diesel (using 94 grams CO₂eq/MJ). This results in a total annual savings of 45 million tonnes of GHG not released into the atmosphere. This is up from 73.5% savings as recorded in 2018.

The EBB said that the decrease in GHG emissions could be traced back to increasing usage, improved fuel performance and reporting of actual rather than estimated GHG emissions.

PHOTO: ADDBESTOCK



BIODIESEL



PHOTO: OMV

OMV chemical recycling plant in Schwechat, Austria



There's already a very strong market for used cooking oil, it's not waste"

DORIS MATSCHEGG, BEST

market is very competitive.

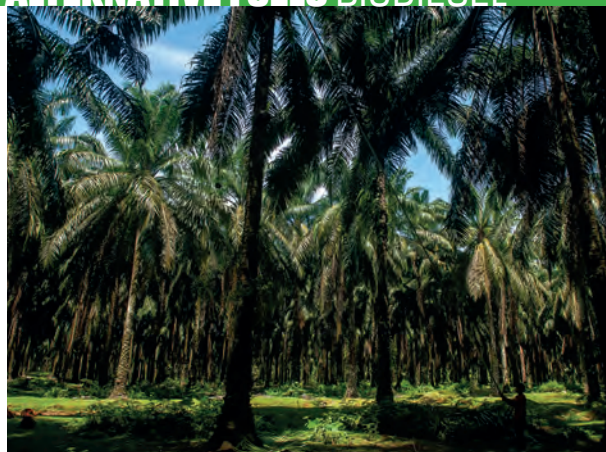
"This could lead to waste oil being more expensive than virgin because it's in higher demand," she notes.

In addition to other sources, palm oil can be used to produce biodiesel. But based on the understanding of how global palm oil demand has caused deforestation in growing regions, European regulations no longer allow biodiesel from palm oil to be included in low-carbon targets.

"It's not forbidden to use [palm oil], but there's no related incentive," states Matschegg.

UPS AND DOWNS

According to information from the AMF (Advanced Motor Fuels) Fuel Information System, biodiesel has already carved out a sizeable market niche across Europe; every litre of commercial diesel fuel is now required to have a percentage of bio-sourced product.



Fuel based on palm oil cannot be included in European low-carbon targets PHOTO: REUTERS/NURPHOTO

This is denoted by B5 and B10 diesel, which respectively have 5% and 10% biodiesel. Some regions further offer a B20 product.

But unlike HVO, which can act as a 100% substitute (or drop-in replacement) for diesel, FAME-based biodiesel is rarely offered as B100. This comes down to the molecular makeup.

Information notes that when biodiesel is in storage, it can interact with any available oxygen. This promotes the fuel aging process and results in a higher viscosity and acid content. The acid can corrode and degrade engine parts which haven't been suitably upgraded.

Instead of attempting to remove the oxygen, best practise involves keeping the biodiesel in storage for as little time as possible before it is shipped. This quick turnover helps to reduce oxygen-driven acidification and algae growth.

Biodiesel is also hygroscopic, meaning that it will absorb any available moisture. As such, the production and storage processes attempt to limit water levels at every step of transesterification. Water not separated from the fuel can promote rust and other contaminants, adding maintenance time and possibly forcing the premature retirement of an engine.

On the plus side, biodiesel has a higher lubricity rating than HVO. This, because the latter has sulphur and aromatics (unwanted molecules within the fuel) removed during the production process. On the other hand, biodiesel

36 >



Rapeseed oil can be used to produce biodiesel

PHOTO: REUTERS/SOPA IMAGES

retains some of these minerals which deliver properties that can extend overall engine life.

As mentioned, biodiesel now has a sizeable market share across Europe. According to numbers published in 2020, FAME-based diesel amounted to 4.1% of the region's fuel energy supply. HVO contributes about 1.3%.

In 2023, a report from the European Biodiesel Board (EBB) noted that total global biodiesel production in 2022 reached 52 million tonnes. The EU (excluding the UK) accounted for most of this (13.7 million tonnes); Germany leading the way with 3.4 million tonnes output. Other key producers, include the US, India, China, Argentina and Singapore.

As it stands, about 70% of the costs involved with biodiesel production are related to feedstocks. The report from the EBB noted that 76% of biodiesel stocks produced in the EU come from agricultural crops, primarily rapeseed oil. This, as the use of palm oil is on the decline.

It is expected that both production of biodiesel and HVO will increase over the second

Cetane ratings

The cetane rating of a fuel refers to the potential energy or 'combustion speed' of a given sample. Looking at diesel fuel, the number rating is dependent on the distribution of fatty acids in the feedstock, where those with more saturated volumes deliver a higher cetane number.

With regards to FAME, those produced using animal fats and oils will generally have a higher cetane number than fuel from plant stocks.

In Europe, the minimum cetane rating for diesel fuel is 51. With an average cetane rating of 47, European biodiesel has a higher average cetane number than fossil diesel in North America (minimum 40, average between 42 and 45).



Biodiesel samples in lab

half of this decade. But it remains to be seen whether this will help to reduce prices, or whether changes to the market will have their own impact.

Matschegg states that if the sale of passenger cars with IC engines is banned, it will have a knock-in effect on the FAME market. But as marine and aviation customers enter the

market in search of low-carbon fuel alternatives, it's possible FAME and HVO will remain in play for some considerable time.

PPI

Engine Cooling Solutions



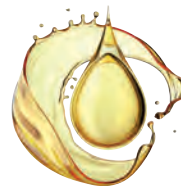
Jacket Water Header tank heat exchangers

For engines rated up to and in excess of 1 MW.



Induction Air Water cooled intercoolers

For engines rated up to 850 kW.



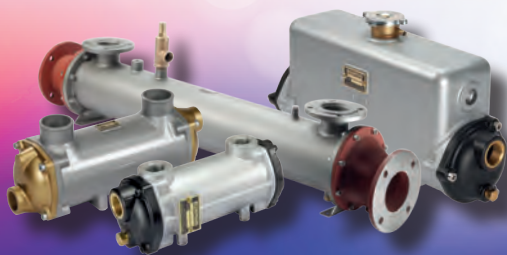
Lubrication Oil Engine & transmission oil coolers

Heat recovery for engines rated up to 8900 kW, with up to 30 bar oil pressure.



Exhaust Gas Exhaust gas heat exchangers

For engines rated up to 1 MW, recovering up to 673 kW of heat.



Efficient, cost effective cooling solutions for Engine Driven Gen-sets, Pumps, HPU's and Compressors; Co-Generation Systems; Off Highway Vehicles; Fire Protection Systems, plus Marine Engines, Transmissions and Gen-sets.

Visit www.ej-bowman.com for full details of the extensive range, call our technical sales team on +44 (0) 121 359 5401, or email sales@ej-bowman.com

EJ Bowman (Birmingham) Ltd Chester Street, Birmingham B6 4AP, UK
Tel: +44 (0) 121 359 5401 Fax: +44 (0) 121 359 7495
Email: sales@ej-bowman.com www.ej-bowman.com

BOWMAN[®]

100 YEARS OF HEAT TRANSFER TECHNOLOGY

FREE

POWER PROGRESS

INTERNATIONAL



SUBSCRIBE FREE TODAY TO RECEIVE:

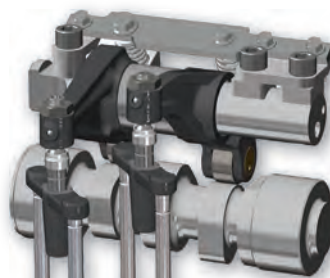
- 4 issues per year of the magazine in digital format available on the day of publication
- Enhanced additional content including photo galleries, audio and video
- Weekly eNewsletter - keep up-to-date with the latest industry news
- Subscribe for your free digital issue here today www.khl.com/free-subscription



REDUCED EMISSIONS

Our in-engine emission solutions help OEMs meet global regulations by optimizing engine and aftertreatment systems for better emissions, fuel economy, and exhaust thermal management.

- 2.76% fuel savings with Jacobs® fully-loaded, HD truck during on-highway testing.
- CDA and VVA technologies reduce emissions and fuel consumption.
- Modular design with HPD® and standard engine brake technology.



Jacobs®

cummins.tech/jacobs



Customised Lithium Batteries for industrial machines and electric vehicles



Over **400MWh** delivered

More than **650 different models**

Over **25,000 lithium batteries** produced

54 countries served

Flash Battery Srl - Italy
+39 0522 1215130

info@flashbattery.tech
www.flashbattery.tech

**One technology
endless applications**

New Holland Agriculture is investigating alternatives to fossil fuels for powering agricultural machinery, and the broader topic of energy-independent farms. By **Roberta Prandi**

New Holland Agriculture, part of the CNH Industrial group, has been working for many years to support the shift to clean energy. This has included the launch of the first commercially available tractor powered by biomethane in 2021, the T6.180 Methane Power.

Alessandro Zilli, business manager, Alternative Fuels, at New Holland Agriculture, explained that the race for more sustainable power solutions in agricultural applications has three major contenders: hydrogen, battery-electric and gas.

“The key technological challenge for all these fuels is energy density, or rather the capability to reach an almost-equivalent performance and range as diesel fuel,” said Zilli.

“For example, to deliver the same potential as a tank of diesel, compressed natural gas (CNG) needs more space; less so for its liquefied form (LNG).”

ENERGY ECOSYSTEM

“Most importantly though, all these new technologies carry a novel system approach which is radically changing the mindset of the various players,” said Zilli. “In agriculture this has crystalized into a vision of an entire ecosystem, including decentralized power generation utilizing renewable energy sources such as solar or biomass.”

In this scenario, the tractor is no longer simply a machine for field work, but an integral component in a complex business operation encompassing the entire farm.

“Farmers who are interested in these new technologies have a pretty clear idea of the potential represented by the circular economy and how producing their own fuel can shield them from market price fluctuations.”

PHOTOVOLTAICS

About €1 billion has been directed at development of advanced agrivoltaics systems.

ALTERNATIVE

**New Holland T4
Electric Power tractor**



“Farmers who are interested in these new technologies have a pretty clear idea of the potential represented by the circular economy”

**ALESSANDRO ZILLI,
New Holland
Agriculture**

**New Holland T6.180
Methane Power**



These use photovoltaic panels which are compatible with the cultivated land on which they are positioned, protecting the soil and slowing down water evaporation due to climate change.

“These systems require the farmer to balance their land production with energy harvesting. This new breed of farmers needs to possess advanced agronomic competencies that range from management of a photovoltaic plant to the best ways to manage crops being grown in these changing conditions.

“This new approach goes hand in hand with digital transformation and process automation,” said Zilli. “Imagine that agrivoltaic farms will

FUELS FOR FARMING



be based on an interconnected system between agriculture and energy production.”

In 2023, New Holland Agriculture announced it would participate in the Agri Solar Demo Farm project. Operated in cooperation with three other companies, Hubfarm, REM Tec and xFarm, this pilot project will setup an energy-independent 14-hectare farm in the Mantua province of northern Italy.

BIOMETHANE POTENTIAL

The European Union is also championing infrastructure creation for production of biomethane for use in power generation and transportation, although at this point Italy is behind the curve. According to the European Biogas Association (EBA) there are just 33 plants for biomethane production now operating in the country.

“But [Italy] has a major installed capacity for biogas, with 1,039 plants between 0.5 and 2 MW,” explained Zilli. “Public incentives for these plants are coming to an end in 2027, when

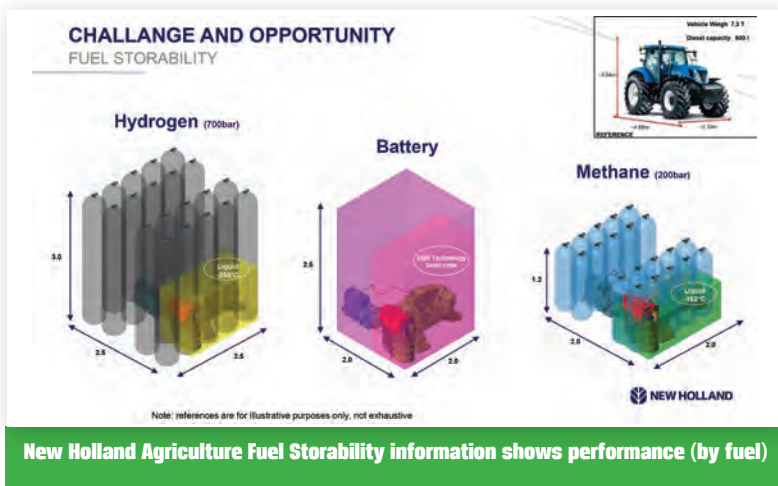
some could be converted to biomethane.

Any farm producing its own biomethane will have a vested interest in operating its machines using the same fuel. Zilli said that the T6.180 Methane Power tractor has the same power and torque curve as the T6.180 Diesel.

Instead of a diesel fuel tank, the model has seven gas containers mounted in the central body of the tractor which can hold up to 185 liters of fuel. A Range Extender option adds more containers at the rear for an additional 270-liter capacity.

Zilli: “Biomethane offers a series of benefits, including simplification of the machine layout. There’s no aftertreatment system as with the EU Stage 5 diesel model. Noise and vibration are much lower as well.”

Farmers looking to produce biomethane can also build their own tanking station. “There are already examples of this within a circular economy, where farmers have recharging stations for both biomethane and electric machines. The power even supports other businesses, including breweries, dairies or restaurants,” added Zilli. “We’re also seeing consortiums establishing biomethane production plants using biomass from a number of local farmers.”



EXTENDED SWITCH

Despite these opportunities, Zilli clearly understands that the agricultural market cannot simply transition to biomethane and electric power. “There will be a switch from fossil diesel to a gradual mix of other technologies, including biomethane, electric, while some activities still use diesel or HVO,” he said.

“HVO [hydrotreated vegetable oil] has the advantage of utilizing the current diesel infrastructure. Also, it has no major technological challenges for use with an internal combustion engine. Currently, the real challenge with HVO is production.”

This is a complex and mixed scenario, but farmers can turn to a number of technology suppliers, associations and cooperatives to help lay the groundwork for the shift to future farming. Zilli is optimistic that developments will bring together a series of alternatives that will ultimately become interconnected with public energy and help to achieve future efficiency goals.

PPI



Advanced photovoltaic farm at New Holland Agriculture; panels help to prevent water evaporation

Roberta Prandi attended the Kohler Demo Days 2024 event for a look at KSD engine power applications and alternative fuel developments

BALANCING DIESEL AND ALTERNATIVE FUELS



It has become a tradition for the trade media to gather every year at Kohler Engines' headquarters in Reggio Emilia, Italy, for the company's Demo Days event.

The focus of this year's meeting was the KSD (Kohler Small Displacement) engine family. In production since 2023, the range was designed by the Kohler R&D team from the ground up.

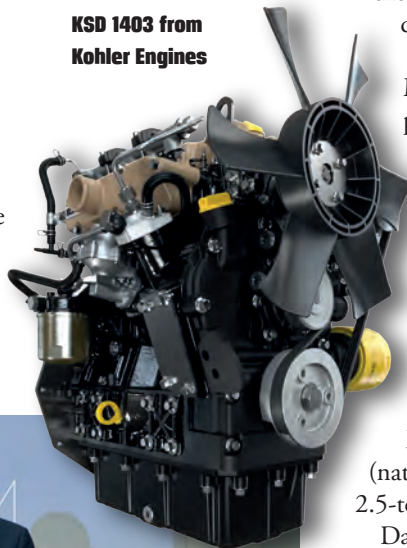
According to Abhiroop Garg, product manager KSD Engines, the R&D efforts behind the diesel engine family have resulted in a compact model which offers good fuel economy and low total cost of ownership. He explained: "KSD units are compact, fitting under challenging hoods and canopies, while reaching a remarkable torque to displacement. The engines have the best torque density in the 19-kW power class."

ENGINE CUSTOMERS

A customer using the KSD engines is MDB Technology, an Italy-based manufacturer of

Vincenzo Perrone, president of Kohler Engines, said the KSD engines offer reliability and power needed by machine OEMs

KSD 1403 from Kohler Engines



radio-controlled machinery for use in harsh and dangerous environments. The engines now feature in the Green Climber range of machines, while there are plans to use them in the Special Machines line.

According to MDB, a primary advantage of KSD engines is universal emissions compliance (with no aftertreatment or recalibration) in all global regions. This is complemented by the favorable power-to-weight ratio and no derating at altitude for turbo models.

Marco di Biase, purchasing manager at MDB Technology, noted he had also been pleased with Kohler Engines' aftersales service, saying it had been the best he had encountered in the marketplace.

Other machine manufacturers presenting with MDB at the Demo Days included Caron, which showed its C50 agricultural tractor, fitted with the three-cylinder turbocharged and aftercooled KSD 1403 TCA. This was joined by the MultiOne 6.3 iDS mini loader, fitted with the KSD 1403 NA (naturally aspirated) and the JCB 25Z-1, a 2.5-ton tracked mini excavator.

Davide Fontana, manager – KDI Project, at Kohler Engines, explained that the KSD engine used in the JCB 25Z-1 mini excavator had shown a good transient response. Also, an auto stop function which can shut off the engine after 30 seconds of inactivity played a part in improving fuel economy by 5%.

The collaboration between JCB and Kohler dates back to 2012. Since that first use-case of



the EU Stage 3b KDI engine, the machine OEM now offers 20 machines equipped with Kohler engines.

NEW FUELS

A chat with Nicola Scinicariello, Kohler Engines' director of Advanced Engineering, revealed that while the Demo Days event was primarily focused on diesel engine technology, the company is also developing solutions for alternative fuels.

"HVO (hydrotreated vegetable oil) is of course a viable alternative to fossil diesel and all our engines are approved for the use of HVO," he said. "We're seeing a diverse market approach, though. In cases where there is an aggressive push towards decarbonization and an immediate 100% reduction in CO₂ emissions, in these instances HVO is not even considered.

"But there is also a less strict approach, which seems to be prevailing lately, where alternative fuels are considered not only a bridge but a sustainable solution essential to reaching a zero-carbon future. In these cases, HVO is obviously one of the fuels being considered, especially as it can immediately be used in most of existing engines without any modification."

Scinicariello said that since 2023, Italian energy company ENI had introduced HVO at a lower pump price than diesel, resulting in a favorable push across the market. This is evidently now being pursued by other providers.

"There is a similar trend across Europe, making HVO available for road mobility. While Neste in Finland was a pioneer, more companies are now making HVO available at refueling pumps."

There are other fuels which do require some

Kohler Engines plant in Reggio Emilia, where KDI engines are manufactured



HVO (hydrotreated vegetable oil) is of course a viable alternative to fossil diesel and all our engines are approved for the use of HVO"

NICOLA SCINICARIELLO, Kohler Engines

specific engine development. "Hydrogen seems to be one of the preferred choices, supported by a lot of investment in hydrogen production. It has the disadvantage of its low volumetric density in gaseous form and in cost, which is still high when compared to more conventional fuels."

Scinicariello said that Kohler is also looking at the potential for using methanol and ammonia.

Methanol is attracting more interest as an energy carrier as it can be produced with surplus green energy, combining hydrogen from electrolyzers with CO₂ from carbon-capture processes.

That said, methanol is not suited for use with off-highway machinery. "First of all, the invisible flame is a potential danger with methanol. Secondly, engines running on methanol need a diesel

pilot injection to start combustion. That means additional hardware, which is not compatible with compact, smaller engines used in mobile applications. As an alternative, engines should be redesigned with a spark ignition."

Ammonia is another interesting energy carrier, but not a ready solution for off-highway machinery. "Ammonia is toxic and corrosive. Engines using ammonia typically need a combustion promoter (natural gas or H₂) which also makes the engine more complex," said Scinicariello.

HYDROGEN POTENTIAL

Kohler presented its KDH (Kohler Direct Injection Hydrogen) engine at Agritechnica 2023. Hydrogen and the DI system were selected as development directions due to a similar performance range as diesel, while configurations and interfaces supported ease of assembly.

"We are now waiting for developments in hydrogen production and availability, plus further development of engine components capable of coping with hydrogen fuel."

Scinicariello explained there are still difficulties with component degradation when using hydrogen: "The hydrogen atoms diffuse into the metal structure, making the material brittle. Hydrogen is also corrosive and has no lubricant capability, so cannot combat friction. Fuel injectors are a concern; injectors available now have a limited life, but manufacturers are working on second-generation components to achieve longevity closer to conventional diesel injectors."

PPI

APPLICATION

An expert from Danfoss Power Solutions talks about how application of hydraulics and electric motors is playing out across the off-highway machine market.

By **Julian Buckley**

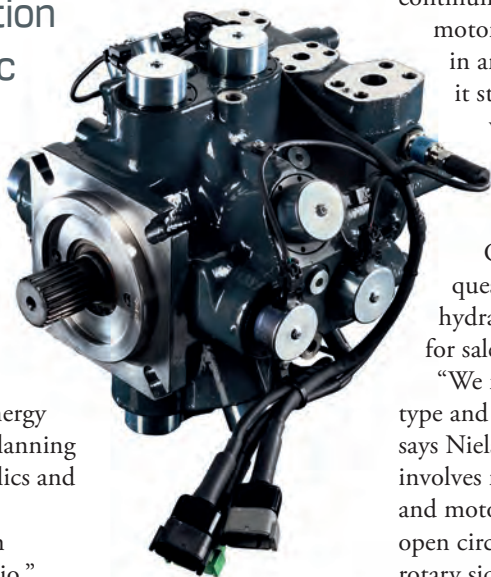
According to Simon Nielsen, a Staff Systems Engineer at Danfoss Power Solutions, decarbonisation and energy efficiency are now the lead goals when planning development and deployment of hydraulics and e-motors across a given application.

“We still have our legacy businesses in hydraulics, a very strong product portfolio,” he says in an interview with *Power Progress International*. “But through my work in solutions R&D I have more visibility of what’s coming up, the highlights, and decarbonising and efficiency is how we’re looking to improve the technology.”

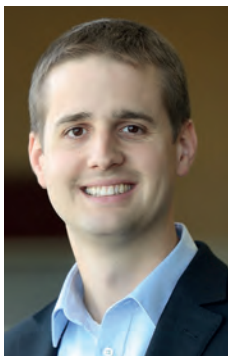
Nielsen says that much of the new tech now being launched across these two product areas (where hydraulics solutions are delivered from Danfoss Power Solutions and electric motors, inverters, chargers, etc., are produced by Danfoss Editron) further incorporates elements from the company’s Digital Displacement technology portfolio.

“Digital Displacement has been in development for a number of years,” he explains. “Instead of a standard axial pump, for example, the products use a radial piston design which is digitally controlled. This means the unit does not use a physical swash plate; instead, the valves are controlled electronically, which means they are much faster to open and close. That delivers game-changing efficiency and energy consumption reductions across the board.”

Asked if such advances in e-motors was causing a decline in demand for hydraulics, Nielsen responded: “There are some cases where electric drives are being used as



Danfoss Digital Displacement hydraulic pump with three outlets



At the component level, an electric motor has the highest efficiency”

SIMON NIELSEN, Danfoss Power Solutions

replacements for hydraulics, that business is continuing to grow year on year. [Electric motor drives] have allowed us to compete in areas where we did not previously. But it still represents a relatively small share when compared to the hydraulics part of our business.”

COMPETITORS, OR NOT

Considering these responses, the question then arises as to whether hydraulics and e-motors are even competing for sales in the same application areas.

“We really have to look at the application type and the use-case for the equipment,” says Nielsen. “That’s whether the application involves rotary actuation, a traditional pump and motor, or work function hydraulics, the open circuits controlling cylinders. On the rotary side, using a motor would be more straightforward because it’s replacing rotary for rotary. On the work function side, I don’t see them as competing – yet – but more complementary.”

“I think it’s in such cases as propel transmissions that you will see hydraulics and e-motors competing head-to-head as a solution choice.”

Danfoss electric wheel loader



ADVANTAGE

It might be supposed that adverse working conditions, such as dust, high temperatures and moisture, might preclude only using a closed-loop hydraulics solution, as an electric motor could be sensitive to those factors. But Nielsen says that's not the case.

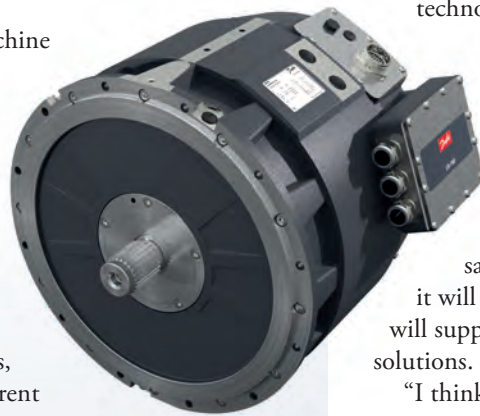
"I don't think there are any overarching limitations which say 'electric drives can't do this'. It might be a little different with linear actuators, but for rotary electric drive technology the vibration and shock ratings, the environmental factors, they're generally not a concern. These are exceptionally rugged units."

With that in mind, the delineating features which dictate the type of solution largely come down to duty cycles and total cost of ownership. Nielsen: "When I look at a machine where all the energy is going into the hydraulics, the cylinders and swing drives, that's a pretty strong case for keeping the final actuation devices as it is."

PERSONAL PREFERENCE

More than performance, the selection of a machine using a hydraulic or an electrified solution can simply come down to personal experience. As with electric cars, some customers can be put off by the apparent

**Danfoss Editron
EM-PMI375-T550
electric motor**



complexity, the removal of any opportunity to fettle and fix the e-motor – where hydraulic systems can be repaired onsite by a skilled mechanic.

"I think that's absolutely a factor," agrees Nielsen. "I've been with Danfoss about 15 years, I started out with hydrostatic transmissions. About five years ago, I started evaluating the potential for electrification, the different decision points which might support changing the technology.

"I'm from a farming background myself and whether it's a bias or customer perception, those views have to be taken into consideration when looking at the use and adoption of new technology."

Going back to the automotive analogy, Nielsen thinks that acceptance will come with time.

While the example with pure EVs still holds true, petrol/ electric hybrids are now widely accepted (at least based on rising sales figures). As with many industries,

it will be a case of employee churn which will support wider acceptance of e-motor solutions.

"I think that those employees who have come into an industry where maintenance is already contracted out will be more accepting of new tech. That's balanced by delivery of durable products which are reliable in any working conditions, they remove the need to know how to maintain the hardware," he says.

MACHINE 'FEEL'

Again with the automotive analogies, some vehicle customers were unhappy when hydraulic steering and related work function systems were replaced by semi- or wholly-electric modules. The lack of feel with electric systems was readily apparent, removing a key element of the driving experience.

The same could be said for hydraulic and e-motor solutions on working machines, where the forced feedback of a hydraulic system helps an experienced operator get the best out of the equipment.

Nielsen agrees, saying that this relates back

45 >



PEOPLE AND GOODS ON THE MOVE

Meet the pioneers of transformation



Get your
ticket now!



Hannover
September 17–22, 2024

iaa-transportation.com

to older machines where the hydraulics systems were linked directly to a mechanical joystick or pedal. But electro-hydraulic control systems with electronic human-machine interfaces have been in use now for about 20 years and over this timeframe companies like Danfoss Power Solutions have been working to improve the driver interaction.

“These systems use an analogue electrical or CAN signal,” he says. “We’ve been working on sensitivity, improving sensor feedback and algorithmic performance to give the operator that control. The systems have been improved, though, with the development of new actuators and controllers.

“As an engineer, my challenge is to come up with the right control system and software design which maps the operator inputs and controls the low-level inputs in a way that’s stable and provides the right level of refinement.”

Of course, the over-riding goal is to reduce

energy consumption to make machines more efficient and improve overall sustainability. Nielsen says that comparing the two depends on the “base energy source” and usage across the application.

“Looking at base performance maps for the highest-performing hydraulic drives and electric motors, the electric motors have an advantage; operating efficiency for an electric motor can be above 90%, peaking at 96 and 97%. Hydraulic drives can reach the same numbers, but under heavy usage they can drop to much lower percentages.

“At the component level, an electric motor has the highest efficiency. But it’s really a whole-system challenge. And that brings up what’s driving adoption of electric motors, which is hybrid or fully-electric machines. With those, it’s one less energy conversion, and that offers a clear benefit

for e-motors. But the equipment has to be fit for purpose and that currently means a hybrid hydraulic-electric system.”



Danfoss PMI240
ehydraulic power
module

PPI

Power BRIEFING

GLOBAL POWER INSIGHT - EVERY DAY

MAKE THE BEST DECISIONS FOR YOUR BUSINESS

Sign up for our Power Briefing today and gain access to **high-quality analysis** of key issues and global best practices. Our briefing is designed to help you make the best decisions for your business and **stay ahead** of the competition.

Don't miss out on this valuable resource that will help your business **thrive!**



CREATED BY

**POWER
PROGRESS**

POWERED BY **khl**



SIGNING UP IS
QUICK, EASY AND FREE.
JUST SCAN THIS QR CODE

At its recent Power Generation Symposium 2024, Rolls-Royce Power Systems took the opportunity to outline a series of new product strategies intended to help reduce the carbon footprint of its customers.

This included an announcement covering the planned 2025 introduction of the mtu EnergyPack QX for the 50 Hz microgrid market. According to details presented by Andreas Görtz, president, Business Unit Mobile & Sustainable, the battery energy storage system (BESS) will improve microgrid efficiency and, in turn, reduce related emissions.

“Batteries will play a key role in storing renewable energy,” he said at the symposium. In an exclusive interview with Power Progress International after the presentation, Görtz went into more detail as to how that energy storage will play out across future installations.

“The BESS represents a huge opportunity when looking at optimisation of a microgrid. In one case, we have a customer in Pakistan who has purchased our gas-powered gen sets [gas is cheaper than diesel in Pakistan] because the local grid is unreliable. Since then, they have installed photovoltaic [solar] panels to help reduce fuel costs, but without any storage capacity they are not getting maximum energy value from this investment. With a BESS added to the microgrid, any excess energy can be stored for later use.”

PEAK SHAVING

As that collected energy is delivered back via the microgrid when demand increases, it helps to reduce draw on the local grid and vis-à-vis cut overall energy costs. Additionally, reduced draw from the local grid supports what is known as ‘peak shaving’. In many global regions, instances of peak draw are used to set the price a customer will pay over the year, so any reduction in those peaks is reflected in a lower per-unit energy cost.

The addition of a new BESS to the existing range of battery solutions offered by Rolls-Royce Power Systems will help with delivery of fully-customised microgrid solutions. But as Görtz explained, this is a more complicated process than it first appears.

“It’s a very complex area. You need a specialist to develop each microgrid based on a variety of factors, anticipated demand, the load profile, the cost of energy – both for the gen set and the local grid – and how much space you have for generation of renewable energy. These and a series of other factors all have to be taken into account.”

Julian Buckley finds out that existing technology can help to achieve considerable emissions reductions across microgrid installations



mtu EnergyPack QX installation at energy storage specialist SemperPower

RIGHT HERE,

CHANGING ROLES

Up until about 10 years ago, Rolls-Royce Power Systems was still a long way from being a systems integrator, as Tobias Ostermaier president, Business Unit Stationary, explained.

“We started out delivering diesel engines for gen set manufacturers, which led us to develop engines with higher efficiency levels and lower emissions. We went on to develop our own gen sets; but even at our last symposium event, we were still focused on the energy transition, the switch to low-carbon fuels. Now we’re ready to deploy large-scale energy storage systems, which has moved us closer to our end customers and the energy market.”

“That market will not support a plug-and-play solution, every microgrid will be different. Call it a decentralised energy solution or a microgrid, but what you’re looking at is a configurable, customised power generation and supply installation.”

There are some appreciable advantages beyond basic power delivery, as Görtz stated: “We need to get the message out to every customer that if you add PV panels and an integrated BESS function to every installation we have on the market, you would immediately lower related emissions by about 30%. This is



Now we're ready to deploy large-scale energy storage systems, which has moved us closer to our end customers and the energy markets"

TOBIAS OSTERMAIER,
Rolls-Royce Power
Systems



RIGHT NOW



emissions across all of these applications.

Yet the underlying thought remains that while this would be for the 'greater good', it's also a veiled sales pitch intended to market additional hardware.

Görtz: "The integration of the renewable energy hardware and the BESS has an initial cost. But we estimate that the savings will see that expenditure amortised in about two to four years. After that, these upgrades will deliver on-going energy cost reductions to the customer."

Ostermaier added his thoughts: "The microgrid market is not growing as fast as we would like it to; that's because we must make a business case to each customer. Along with the potential for emissions reductions and efficiency gains, we need to prove that the technology can deliver to the level we are describing."

As mentioned, the customer in Pakistan selected a gas-fuel gen set as it is cheaper to operate than a diesel version. There are other benefits, too, in that heat from the gas gen set is easier to collect and reuse in such applications as a textile factory.

"The CHP [combined heat and power] helps the business to achieve additional savings, but it's more than just reduced running costs," Görtz explained. "In some areas of Pakistan, there's no power from the grid for extended periods over the day. So having an island gen set in combination with a microgrid is essential for keeping the business up and running."

NATIONAL PROJECTS

Storage of renewable energy is not only limited to individual businesses. In Spain, the national government has targeted achieving a 100% renewable energy supply by 2050. Investment has supported the installation of massive wind and solar sites around the country, together with related storage installations.

Importantly, the storage facilities have been granted the same access rights to the national grid as any other energy generation installation, meaning they will be able to export power under the same access and connection permits.

Having a battery energy storage system integrated into a microgrid has, up until now, largely been dependent on the customer and the budget for a given project. But the upfront expenditure for these systems is only a small part of the picture, particularly when balanced with the potential for overall energy cost reductions, guaranteed on-demand power delivery and lower emissions.

PPI

not in the future – this is a solution which is available now and it's affordable."

SUCCESS OR SALES

Speaking at the symposium in Augsburg, Tobias Ostermaier noted that Rolls-Royce Power Systems now has about 90,000 power generation installations up and running across 175 countries. Factor in use of sustainable fuels and BESSs, there's an opportunity to cut

Rolls-Royce Power Systems mtu EnergyPacks QL at the Abo Wind solar park

» IAA
TRANSPORTATION

BIGGER



According to details published by the organisers of IAA Transportation, the 2024 edition of Europe's premiere commercial vehicle trade show is already set to include more exhibitors than the previous event in 2022.

In addition to mainstays such as MAN, Volvo, Mercedes-Benz, Renault and Iveco, for the first time Tesla will be present at the show – while unconfirmed, it could be anticipated that the lead 'disruptor' in the alternative-power trucking market will have its Semi Truck on display.

Such is the overall demand that organisers of IAA Transportation reported in May that they had already received 13% more exhibitor registrations than for the '22 event; about 26% are first-time exhibitors.

"IAA Transportation 2024... is gearing up," said Jürgen Mindel, MD responsible for IAA at the VDA. "We are excited to showcase the industry's innovative power to our visitors.

"I am confident that in September in Hanover, companies will once again demonstrate impressively how their innovations are driving the industry and society forward."

All things considered, it looks like the upcoming IAA Transportation fair will be an exciting event. Read on for more details as to what some companies will have on display at the Deutsche Messe in Hanover.

MAN TRUCKS

Hall 12, Stand C04 (main stand)
MAN Truck & Bus has already announced that it is planning to start the first customer handovers of its

A look at what just a few of the companies taking part in the upcoming commercial vehicle show will have on display

eTGX and eTGS battery-electric trucks this year. In support of that, the OEM will be presenting the full range of BE models at the upcoming IAA Transportation fair.

This will include new chassis versions of the series, which are set to be offered with a broad choice of wheelbases, battery packs and charging options. Customers will also be able to customise the cab to suit anticipated usage.

Looking at the 4x2 tractor, this can be specified with between four and six battery packs, which offer maximum energy storage capacity of between 320 and 480 kWh. Capable of hauling up to 11.2 tonnes, this truck has a range of between 260 and 400 km (dependent on load, conditions and terrain).

Alternatively, the 4x2 chassis cab can accommodate between three and six battery packs with between 240 to 480 kWh. With a maximum load weight of 16.3 and 18.8 tonnes, anticipated range is goes from 195 to 600 km.

VOLVO TRUCKS

Hall 11, Stand TD01 (main stand)
Advance details outlining what Volvo Trucks will have on show at IAA Transportation 2024 promise that the OEM stand will be 'packed with proof points of Volvo's determination to decarbonise transport and prevent accidents'.

Following on from this, the Swedish truck builder will feature its recently-launched FH Aero range. This includes both electric- and biofuel-powered variants, which are now available in Europe, Asia and Africa markets.

The all-new Volvo VNL range was recently launched in North America. Based on a new platform, the model features

'groundbreaking' autonomous technologies, while offering improved fuel efficiency and safety. IAA Transportation will be the first chance to take a look at the new truck in Europe.

Joining these models will be the new Volvo FM Low Entry, the first truck from the OEM be offered with only a battery-electric



Volvo FH Aero

AND BETTER

drivetrain. Intended for urban routes, the FM Low Entry has a series of features to support city driving, including improved cab visibility and pedestrian safety tech. The company's new e-axle will also be on display; the component has been developed for electric and fuel cell applications.

BORGWARNER

Hall 12, Stand C65

Turning to look at suppliers, BorgWarner will be debuting its new lithium-ion phosphate (LFP) battery packs for commercial vehicles.

Developed in cooperation with FinDreams Batteries, the new packs are said to be a 'significant step forward' in supporting the efficiency of CV operation.

To support BEVs, BW will also be showing its new DC Fast Charging station. These are intended for installations such as bus depots and delivery hubs, while also being suitable for public charging facilities. The new chargers deliver up to 95% efficiency to help keep operating costs as low as possible.

BorgWarner will also be showing the latest versions of its legacy products, including turbochargers, exhaust gas recirculation tech and other hardware intended to improve the fuel economy of commercial vehicles, all while reducing emissions.

CONTINENTAL

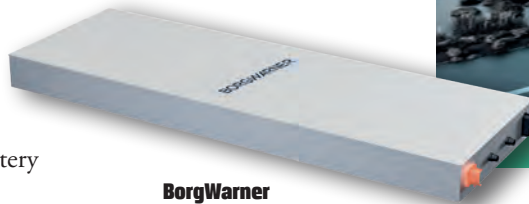
Hall 12, Stand C41

Under the headline banner 'Innovating Transport – From Road to Cloud', Continental is set to present a series of new technologies at IAA Transportation 2024.

Featured systems will include a complete ecosystem intended to support both software-defined vehicle and autonomous driving functions; this will include a high-performance computing system and cross-domain zone control unit that integrates the power supply for cockpit and ADAS components.

Also on offer will be more details covering development of the Aurora driver hardware and 'future fallback' system. This is a dedicated

Continental and Aurora make autonomous trucking systems commercially scalable



BorgWarner LFP battery system in the flat pack format



Hengst Blue.maxx fuel filter

IAA Transportation 2024 will be held at the Deutsche Messe in Hanover, Germany, from 17-22 September.



secondary system which has the capability to take over vehicle operation if a failure occurs in the primary system, such as sensor or other component.

Another new development is the Tough RuNR air spring system. Using a new, proprietary rubber formulation, these components offer a reduced carbon content with no impact on product performance. This helps to reduce the environmental impact of the products.

Continental will also show how it is planning other ways to leverage recycled materials – and improved recyclability – including development of low rolling resistance tyres for heavy-duty vehicles.

HENGST

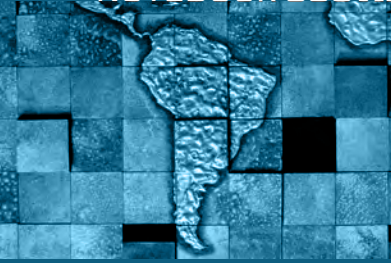
Hall 13, Stand C41

Hengst is set to show a series of filtration products designed to reduce environmental pollution and improve vehicle function.

On show at the upcoming IAA fair, the company will display its Blue.ion cabin air filter. This unit achieves its filter effect through both ionization of particles in the air flow and polarization of the filter media. This creates an electrostatic field to help maintain particle separation over the full lifetime of the filter.

Also on display will be the Blue.maxx filter system, suitable for use with all fuel types. Using a modular design, the fuel filter can be installed as original equipment or as a retrofit solution. The filter can be designed as a two-part pre-filter and main filter, or a main filter with integrated water separator.

PPI



Siemens Energy site at Santa Bárbara d'Oeste



ABOUT THE AUTHOR

MAURO BELO

SCHNEIDER is a

journalist in Brazil.

He can be reached at

belomauro@

gmail.com



OFFSHORE ENERGY GOES GREEN

Investment in offshore power will ultimately deliver greener energy.

By **Mauro Belo Schneider**

Technology developments in the marine energy sector in Brazil can help guarantee energy security. Companies such as Siemens Energy and Wärtsilä have been investing in the so-called ‘green wave’, where Brazil has an enormous regional leadership potential due to its renewable electricity generation capacity.

Arthur Pereira Neto, head of Packaging and Compressors at Siemens Energy Brazil, says that the company has been working to make turbines and compressors more efficient.

“The first role is to

guarantee global energy security, through financial competitiveness and reduction of emissions in the Oil & Gas sector,” said Neto. “The second is the construction of a more resilient offshore environment in which the existing infrastructure, technical knowledge and energy generation technology are key elements to boost the transition.”

INVESTMENT AND INTEGRATION

But the transition to a future of low-carbon energy requires high investment. And the Siemens executive mentions that this has a considerable impact in a geopolitical and economic context, requiring long-term vision and an integrated strategy across all energy sectors.

Siemens Energy is now looking at different decarbonization opportunities in preparing

for the offshore transition. At the Santa Bárbara d'Oeste site in São Paulo state, the company has one of the largest engineering centers for turbines and compressors in the world. Using local hardware, this serves the Brazilian offshore energy market, one of the largest on the planet.

In the last two years, Siemens has signed important contracts in the region. One was with Keppel Offshore & Marine, for supply of topside turbomachines for producing floating vessels, storage and unloading (FPSO). For this project, Siemens supplies energy generation and compression equipment, including CO₂ injection compressors.

“As wind parks expand to more distant offshore areas, subsea power networks will be vital to help reduce the cost of energy, while integrating production hubs for green hydrogen,” stated Neto.

SIGNS OF RECOVERY

Wärtsilä is another company investing in marine power in

Brazil. According to Genil Mazza, sales manager for New Constructions in Latin America, the marine power market is showing signs of recovery.

“After a long period of recession due to low petroleum prices, the industry is showing signs of recovery following new orders from Petrobras [Brazilian state energy company], together with ongoing growth of the agribusiness, mineral exploration and cargo transport sectors,” explained Mazza.

As with Siemens, Wärtsilä is also investing in decarbonization. This comes with the potential for upgraded engines and power systems that help reduce fuel consumption and emissions in ships, using new energy sources such as ethanol, methanol and ammonia.

“A low-carbon future will also impact small shipowners, bringing a new perspective for the maritime industry and demanding modernization of the fleet across Latin America,” foresees Mazza.

PPI



Arthur Pereira Neto,
Siemens Energy

Keep the fuel in shape!

Hall 13, Booth C29

» IAA
TRANSPORTATION

Highly efficient water separation, a high degree of individualization and **reliable filtration**: these are the advantages of our high-performance Blue.maxx fuel filter system.

The Blue.maxx is also suitable for the use of alternative fuels, which is why special test methods have been developed to ensure reliable and long-lasting filtration.

We have filtered out the essentials for you. More at:

→ hengst.com/blue.maxx


Blue.maxx

purifying our planet



Hengst
FILTRATION

Powering bigger better.



From farmlands to quarries to construction sites and beyond, Perkins' largest engines are built and proven to power the machines that take on the toughest challenges around the world. To do that, we focus on what matters most, and take advantage of every opportunity to deliver better results.

BETTER MEANS:

More reliable ▶ *More sustainable* ▶ *More support* ▶ *More optimised power*