

Volvo Group magazine

2.2015

"Our in-house
solution was by
far the best."

Fredrika Berndtsson

LAND OF OPPORTUNITY

ADAPTING TO CUSTOMER NEEDS
KEY TO SUCCESS IN USA

CREATING ENGAGEMENT

HIGHLY ENGAGED TEAMS
SHARE THEIR TIPS

HEAT RECOVERY

THE LATEST FUEL SAVING
TECHNOLOGY FROM GTT

Electric pioneers

How the Volvo Group has been reinforced as the global leader
in sustainable transport and electromobility technology

We are committed and will stick to the plan

ON APRIL 22, the AB Volvo Board of Directors appointed Martin Lundstedt new President and CEO of the Volvo Group. Martin will take office in October. Until then I have been entrusted to lead the Volvo Group, together with the entire Group Executive Team. Our top priorities for the rest of 2015 remain the same.

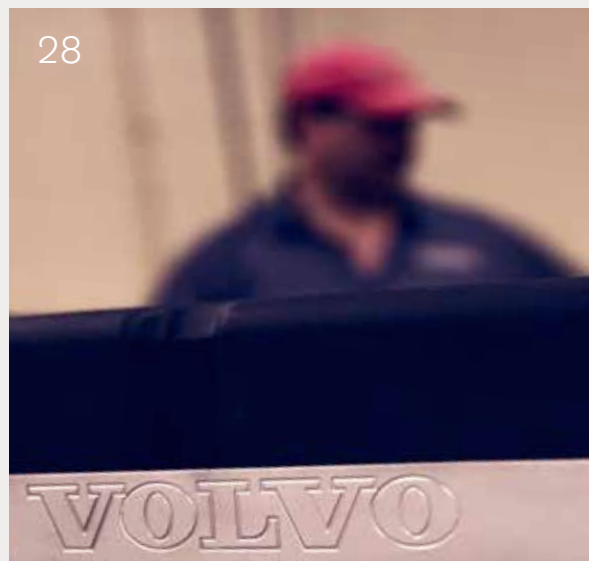
WE ARE COMMITTED to continuing the work we do every day to create value for our customers. And we are committed to delivering on our strategic efficiency programme to reduce the structural cost level in the Group.

Both are vital to our company's future success. We will always put our customers first, delivering products and services that enable them to keep the promises they have made to their customers. We need to deliver on the strategic efficiency programme and close the gap to our competitors. As we presented in our first quarter report, it is clear that we are well on our way but more remains to be done. When we succeed, it will benefit all our stakeholders; customers, employees, suppliers, shareholders and society at large.

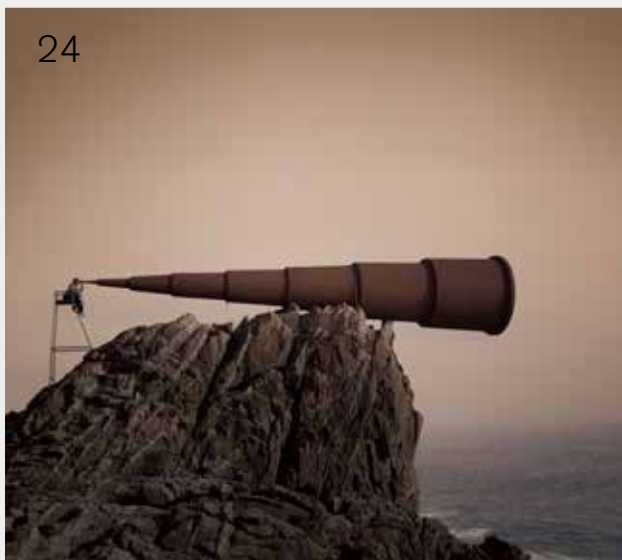
AND THAT IN TURN will generate the means needed to develop the next generation of products and services and pave the way for growing a profitable world leading supplier of sustainable transport solutions.

JAN GURANDER
ACTING PRESIDENT AND CEO,
VOLVO GROUP

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By adapting to the local market, the Volvo Group has managed to turn its American truck business around.

24 Know the competition

No business can afford to ignore its competitors and the Volvo Group is no exception. This is why Strategic Competitive Intelligence is continuously gathering vast volumes of data on the opposition.

28 Simple idea presents advanced challenge

By converting excess heat into energy, new waste-heat recovery technology developed by GTT can further reduce fuel consumption. But getting there has been an incredibly challenging and complex journey.

32 The key to creating team engagement

Employee engagement is highly valued within the Volvo Group but building it is not straightforward. Teams from across the globe share their experiences and suggestions for creating better team engagement.

36 Leading the way in electric buses

The Volvo Group is a leader in the increasingly important electromobility field. But to develop the solution with lithium-ion batteries that are fast-charged at bus terminals has been a long process.

42 Dawn of a new era with Dongfeng

The Volvo Group's joint venture with Dongfeng Motor Group is a powerful alliance that will open up new opportunities in China - the largest truck market in the world.

LET US KNOW YOUR THOUGHTS!

The image of the trucking culture in the USA is often characterised by classic films: mostly men in large, personalised trucks with lots of chrome. But what is life on the road like in reality? How important are trucks both as a means of transport and as temporary homes? In this large USA special edition, you can read what many of our customers think about the products and services from the Volvo Group.

One product that offers a unique solution in a noisy city environment is Volvo Buses' electric hybrid. On pages 36-41, we explore our vision, technology, customers and production in the magazine's different editions. In addition, you can also read about team engagement, our competitors, the Volvo Ocean Race and much more in this second issue of *Volvo Group Magazine*.

The work process behind the production of this new magazine is starting to take shape. But we still want to know what you think about the texts, images and format. So we would like to invite interested co-workers to participate in a Reader's panel. This will involve answering some questions via mail after every issue and sometimes following up questions over Lync or telephone. You are welcome to register your interest at groupmagazine@volvo.com. Please tell us about your work assignments and how long you have been with the Volvo Group.

Pleasant reading!

ANN-MARI ROBINSON, EDITOR-IN-CHIEF



Volvo Group Magazine's editors review pages for the upcoming issue of the magazine. From left: Lotta Bävman, Carita Vikstedt and Ann-Mari Robinson. Insert: Joanna Galczyńska.

PHOTO: JONAS TOBIN

A growing partnership



Mike Hasinec, Vice President of Maintenance, Penske Truck Leasing

народный Vernacular LINGO
자국의白話 le jargon

Lost in translation?

Do you work extensively in a language other than your mother tongue? Has your team come up with a novel method to overcome a language barrier? Or do you have a funny story to share about information being lost in translation? If so, *Volvo Group Magazine* would be interested to hear from you, as we plan to write about the many different languages spoken within the Volvo Group. Please feel free to contact us at groupmagazine@volvo.com.

The Volvo Group's engines are cleaner than those of its competitors. When this was confirmed by customer Penske Truck Leasing, the frequency of preventive maintenance was re-evaluated.

Penske is the Volvo Group's largest customer in North America and since 2010 it has purchased 13,000 Volvo and Mack trucks in the USA alone.

"In the autumn of 2013, Penske presented us with some very interesting data – evidence that our engines run more cleanly than those of the competitors," says Mikael Sievers, Director of Service Engineering in the Americas.

Based on the results of soot and viscosity tests, Penske wondered why Mack and Volvo trucks had shorter service intervals than their competitors, despite having cleaner engines. The Volvo Group took a great interest in these findings and after a year of field tests involving 197 trucks, there were sufficient data to conclude that the service intervals for both engine oil and diesel particulate filters could be significantly extended.

"It's partnerships like this that allow us to achieve strategic business objectives and hopefully do the same for our partners. Here at Penske, we appreciate the business relationship we have with the Volvo Group team and look forward to continued growth with our partnership," says Mike Hasinec, Vice President of Maintenance, Penske Truck Leasing.



Volvo CE is improving energy efficiency

Volvo CE's annual consumption of energy is equivalent to 250 million SEK. The company is dedicated to improving energy efficiency and securing its WWF Climate Savers commitment. The initial phase focuses on idle electricity reduction (electricity wasted during non-production hours). 20,000 kWh were saved in


2014 and the target for 2015 is to reduce by a further 20,000 kWh. The Changwon plant in South Korea achieved a near 40 per cent reduction last year.

"A great improvement," comments Johan Wollin, Director Environmental Care, Volvo CE Operations.

Experiencing UD Trucks

The UD Experience offers co-workers the chance to extend their knowledge of the UD Trucks brand and its products. Employees are given a presentation and a plant tour in Ageo, as well as the opportunity to testdrive the Condor, Quon and Quester. By the end of March, almost 2,000 employees had participated in the programme. In 2013-2014, some 3,500 customers and media representatives took part in the same event.





DEVELOPING TECHNICIANS IN DEVELOPING COUNTRIES

▷The Zambia training programme will see some 140 students trained every year. The aim is to have at least 75 per cent of students find work as engineering technicians after their studies.

▷The Volvo Group also offers apprenticeships in Morocco and Ethiopia, with the percentage of women studying consistently increasing every year. In the latest intake of apprentices in Ethiopia, 14 out of 32 students are women.

Hands-on knowledge

Training programme targets technicians in Zambia

The Volvo Group will train workshop technicians in Zambia in cooperation with the Swedish development agency SIDA and UNIDO, a UN organisation for industrial education. The aim is to increase work opportunities and improve standards in education.

"The need for practical knowledge is huge in Zambia. The training that technicians receive today is not in line with industry needs. Therefore companies are instead bringing in manpower from India and South Africa," says Julia Jonasson, who co-ordinates the Volvo Group's

professional training in developing countries.

Since the mining industry is one of the largest industries in Zambia, the training deals mainly with servicing trucks and construction equipment. The programme, which is scheduled to start in January next

year, will take place at Nortec (Northern Technical College) in the city of Ndola. Some 140 students will be trained every year and the aim is to have at least 75 per cent of them work as engineering technicians or the equivalent after their studies.



PHOTO: UNIDO

Volvo Group apprentices at the Selam Vocational College in Ethiopia.

“The need for practical knowledge is huge in Zambia”

JULIA JONASSON,
CO-ORDINATOR OF THE
VOLVO GROUP'S PROFESSIONAL
TRAINING IN DEVELOPING
COUNTRIES

Positive results for Optifuel Lab

After several months of tests, fuel consumption results for the Renault Trucks' laboratory vehicle, Optifuel Lab 2, have improved. Consumption is down 22 per cent, which means an average of 7.2 litres per 100 km are now saved. This figure corresponds to the savings obtained by using the 20 or so on-board technologies, all dedicated to reducing consumption compared with a 'standard' Renault Trucks T.

“We are of course extremely satisfied with these results. We are not surprised by them,

they confirm the already high estimates we had at the beginning of the project under actual operating conditions,” explains Claude Covo, the project manager at Group Trucks Technology.



24 hours of creativity

Nine teams, including three from the Chalmers University of Technology in Gothenburg, Sweden, recently took part in the Volvo Trucks Open Innovation Challenge – a competition designed to promote the development of intelligent solutions for the transport industry. Each team was given 24 hours to develop a creative

app that offers truck drivers a new value-added service. Three winning contributors will now get the chance to further develop their ideas into finished products. First prize went to Idevio for their proposal to increase traffic safety by providing drivers with information on the road ahead so that drivers can avoid potentially difficult situations or accidents.



Diversity creates business value

13-18 September is a week to mark on your calendars now. These are the dates for Diversity and Inclusion Week, highlighted and celebrated throughout the Volvo Group.

Initiated in 2014, this dedicated week is an opportunity to increase awareness and understanding of how diversity and inclusion add value to the business.

“Respect for our individual diversity is a fundamental part of our company's values. Last year, hundreds of events took place around the globe and it was amazing to see the interest, energy and innovation people put into this week, across units and continents. This year, we will focus on how developing diversity and inclusion adds value to our business and helps us better serve our customers,” says Eric Way, Director of Diversity and Inclusion.



Eric Way

A global dialogue

At the annual Volvo Global Dialogue in mid-April, the top management met the Global Works Council with some 50 union representatives. The Volvo Group is one of the few multinational companies conducting these dialogue forums. The purpose is to further develop the relationship between both parties.



PHOTO: CICCJ JONSON

The Powertrain Production team from Curitiba won the GTO Quality award for implementing Poka-Yoke solutions within operations. Poka-Yoke is a technique for avoiding simple human errors.

Production team from Curitiba praised for best knowledge transfer

Earlier this year, the third-ever GTO Internal Awards were presented. The purpose is to share and transfer best knowledge within the organisation, as well as recognising and acknowledging the hard work put in by employees. The awards cover the categories Safety, Delivery, Productivity, Environment, Diversity & Inclusion and Quality.

A rugged I-Shift for gruelling duty

A rugged version of the Volvo I-Shift automated manual transmission has been introduced for Volvo Trucks in North America for gruelling duty applications. It has been available since May in Volvo VHD vocational models. The I-Shift for gruelling duty is designed for on- and off-road work in construction and other applications requiring frequent shifting.

I-Shift for gruelling duty is available in Volvo VHD vocational models in North America.



2,000,000

... square metres is the size of AstaZero, the world's first full-scale test track for active automotive safety that was launched in 2014. The Volvo Group is one of AstaZero's industrial partners and the test area is located in Borås, Sweden.



Based on feedback

Around 200 fleet owners and drivers were invited by UD Trucks earlier this year to experience recent enhancements to the UD Quester, the heavy-duty truck range designed specifically for emerging markets in Asia. Based on customer feedback, the changes include easier gear-shift, adjustments to the extra engine brake at lower speeds and a new application category, Dangerous Goods. They were all demonstrated at an exclusive test-drive event at the Kaeng Krachang Circuit in Phetchaburi, Thailand.

"Our philosophy is to be responsive to customer needs and so we have gone the extra mile and made enhancements to the Quester based on feedback received," said Christophe Martin, SVP Asia Oceania Sales, GTS.



Volvo Penta's new partner

Volvo Penta has formed a new partnership with McCloskey International, the world's largest independent crushing and screening company. Under the agreement, McCloskey will install Volvo Penta D8, D11 and D13 engines in its range of mobile jaw, cone and impactor crushers, while the Volvo Penta D5 engine will be installed in mobile screeners and trommels.

PHOTO: PER LARSSON / TT



Martin Lundstedt appointed as new President and CEO

The Board of Directors of AB Volvo has appointed Martin Lundstedt as new President and CEO of the Volvo Group, succeeding Olof Persson. This was announced in conjunction with the Q1 Report.

Martin Lundstedt most recent role was as President and CEO of the Scania Group, where he has spent his career since joining in 1992.

Martin Lundstedt will assume his new position in October 2015. Until then, Jan Gurander, the Group Chief Financial Officer, will be acting President and CEO.

Improved profitability reported for the first quarter

The effects of the Volvo Group's strategic efficiency-improvement programme continue to generate results. This was evident in the Q1 report which revealed an improved first quarter for 2015 in terms of both operating margin and cash flow.

Margins have improved in several areas of the Group, despite a negative market mix with significantly lower volumes in Brazil for trucks and in China for construction equipment.

During the quarter, the Group sold a total of just over

48,000 trucks, similar to the same period in 2014.

The Volvo Group also announced the outcome of the IT operations' review. The Group will keep application development and maintenance of business critical systems and accelerate efficiency improvements in this part of the operation.

For the external business and the operation of the Group's IT infrastructure, a process to find an external partner was initiated. The assessment is that this will be more cost-effective for the Group.



Bangalore team awarded Reduced lead-time achievement recognised


This team from the finishing line at the Volvo Buses plant in Bangalore, India, has been chosen as Best OD (Operational Development) team. They set out to reduce

lead times in production by eliminating time-consuming rework. The target was a reduction of 10 hours per bus, but the actual result was an impressive 18.9 hours.

AMERICAN

road to

SUCCESS



HAGERSTOWN
RAPHINE
DUBLIN
GREENSBORO
CHARLOTTE

Welcome to the USA. By adapting to the tough market terrain here, the Volvo Group has turned its truck business around. Now record numbers of Mack and Volvo trucks are driving down local highways. We meet the people who made it happen.

TEXT
JANICE KIZZIAH

PHOTOS
NICKE JOHANSSON



DANNY LOCKLEAR HAS just finished eating breakfast at a sprawling truck stop in Raphine, Virginia, off Interstate 81. It is located about midway between Hagerstown, where Mack and Volvo engines and transmissions are built, and New River Valley, where all Volvo trucks for North America are assembled. Around 19,000 trucks pass along this section of I-81 every day. A growing number – both here and across the USA – are Mack and Volvo trucks.

In 2014, Mack and Volvo Trucks together broke the record for the number of trucks sold by the Volvo Group in the US since the recession of 2008. Volvo Trucks was just shy of its all-time record market share in the region.

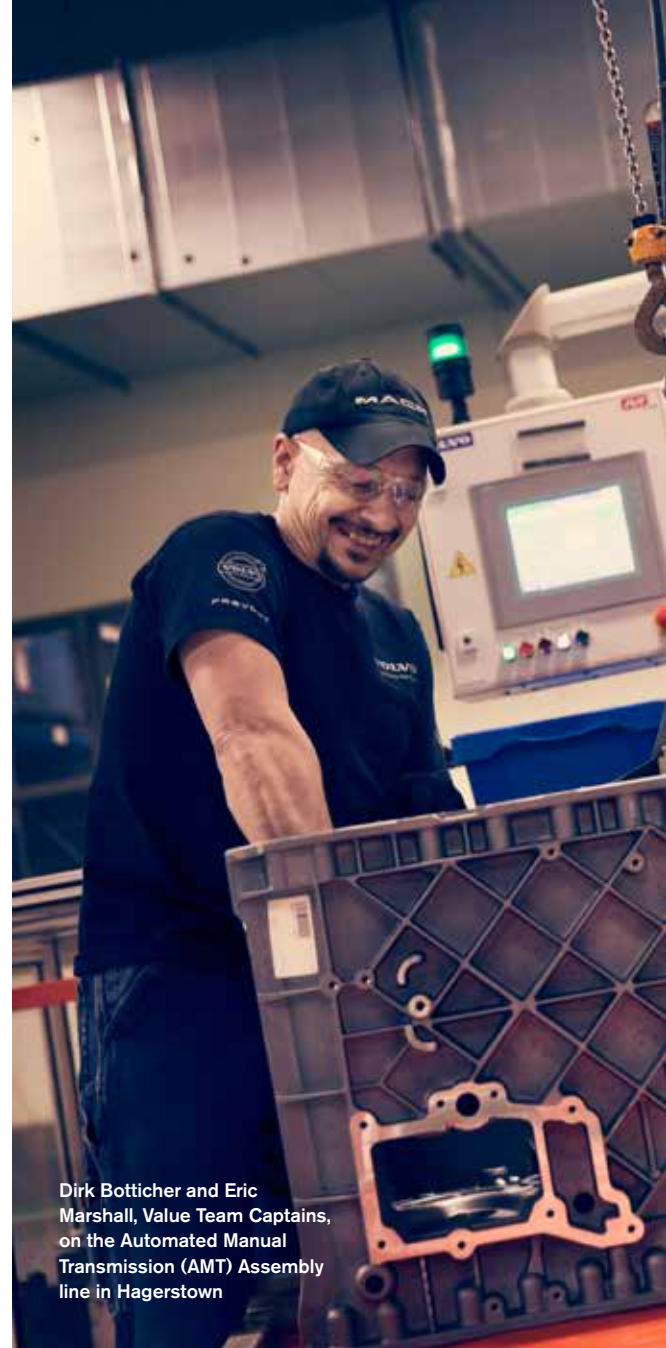
The aftermarket business had its fourth year of record profit as both brands broke sales records for their automated manual transmissions – *mDRIVE* for Mack and *I-Shift* for Volvo Trucks. Aftermarket sales have also been boosted by the fact that Volvo Trucks' customers are now choosing Volvo engines over engines made by other manufacturers. Penetration of Volvo trucks engines in North America rose from 0 per cent in 2000 to 91 per cent in 2014. (Mack trucks meanwhile have always had Mack engines.)

THE GREATER PENETRATION of the Volvo Group-made engines and automated manual transmissions, along with the strong economy, are major reasons why business is going so well for the Volvo Group in the USA.

Danny Locklear, who is in his 30s, drives a 2015 Volvo 670 with *I-Shift* for a trucking company out of Loganville, Georgia. He spends about a week at a time out on the road, accompanied by his two dogs. It is a tough job but pays well, he says.

Locklear is also one of the new US fans of the *I-Shift* – built in Hagerstown, just two hours up the road. He has been a truck driver for 14 years and likes how the *I-Shift* handles. "For me it's been awesome," he says. "It pulls good, rides good. I love it."

By adapting to the needs of US truck drivers like Locklear, who spend their days navigating the vast US



Dirk Botticher and Eric Marshall, Value Team Captains, on the Automated Manual Transmission (AMT) Assembly line in Hagerstown

highway system and delivering goods to its myriad cities, the Volvo Group has turned its truck business around in a market with tough local competition and which is only just now recovering from one of the largest economic downturns in modern history.

"Today, we're making an important contribution to the success of the Volvo Group," says Göran Nyberg, President, Volvo Trucks North America. "That's been a real motivator for our people, to know that we are recognised and needed for the Group's success."

Göran Nyberg had travelled to the US many times before moving there three years ago and he thought he understood the market. Then he began visiting customers and dealers in every region of the country. He saw the pressures they faced from their customers to deliver freight on time, every time. Because trucks run faster and further on US highways than in most



DANNY LOCKLEAR

Danny Locklear, a truck driver for 14 years, learned responsibility early when he became a father at age 16. "I had two jobs mowing lawns and building furniture back then. My dad drove a truck for 52 years and he said, as long as I had a clean commercial driver licence, I would have a secure job to feed my family."

parts of the world, they must be designed and built to withstand the extra wear and tear on components.

MACK AND VOLVO TRUCKS BOTH OFFER vehicles for these long-haul and regional-haul customers and for more specialised jobs like construction. For both brands, their automated manual transmissions have been a game-changer in terms of fuel efficiency and have allowed them to jump ahead of the competition.

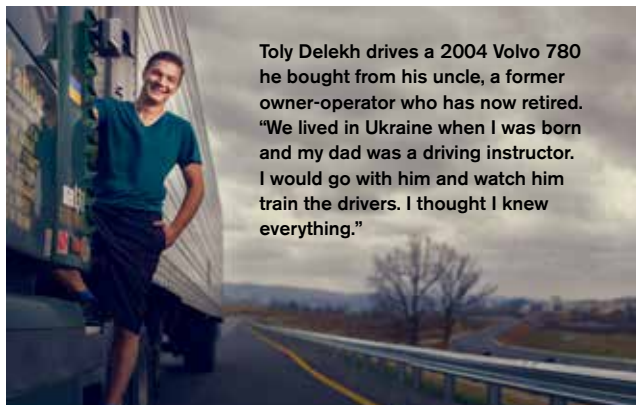
Maryland-based D.M. Bowman has a fleet of 350 trucks, all Mack and Volvo models, and has seen that drivers prefer the new transmissions, hands down. When the company first signed on to test the I-Shift on a demonstration truck in 2011, the driver they selected was against it. "People don't like change, especially when they've been driving the same >



"Today, we're making an important contribution to the success of the Volvo Group," says Göran Nyberg, President, Volvo Trucks North America.



Maryland-based company D.M. Bowman has a fleet of 350 trucks, all Mack and Volvo models. Here, Jim Ward (left), President D.M. Bowman, and Mike Boarman, D.M. Bowman's Director of Maintenance



Toly Delekh drives a 2004 Volvo 780 he bought from his uncle, a former owner-operator who has now retired. "We lived in Ukraine when I was born and my dad was a driving instructor. I would go with him and watch him train the drivers. I thought I knew everything."



James Caldwell, Engine Assembly Operator, directing one of the Automated Guided Vehicles at the end of the engine assembly line in Hagerstown

way for years," says Mike Boarman, D.M. Bowman's Director of Maintenance. "But, when it came time to return the truck to Volvo, he liked it so much we bought it."

The US trucking industry has had a driver shortage for years and Mike Boarman says having the *mDRIVE* or *I-Shift* makes it easier for him to hire new drivers – especially women and younger people.

More uptime is another top priority for today's customers and with good reason. The average cost to a customer when a truck is down is anywhere from \$800 to \$1,500 a day.

"We've transitioned into a just-in-time world," says Jim Ward, D.M. Bowman's President and CEO. "It's all about reliability and uptime, regardless of what our trucks are hauling."

With the market in mind, the Volvo Group has invested in solutions to increase uptime, including telematics systems and support teams brought together in a newly built Uptime Center. In this

123,000-square-foot facility, trained agents work directly with customers and dealers to resolve problems as quickly as possible. Today, the two brands lead the industry in uptime support with Mack's GuardDog Connect and Volvo's Remote Diagnostics onboard communications systems.

TY HUBBARD, TRAINING & Quality Manager for the call center staff, has seen a stronger sense of teamwork since moving to the Uptime Center. "When one of our agents needs help from a technical specialist, for example, it's treated as a priority, every time. We all understand what's at stake when a driver is having an issue with a truck and it feels good to know we're making a difference."



For Mack and Volvo Trucks dealers across the US, shortening the time it takes



Owner-operator Tony Martin recently took his two-year-old son Hunter along in his Mack truck to deliver a load of wild turkeys. Martin has been a truck driver for 20 years and was in a serious accident about a year ago. "I was driving a truck just like this one and it saved my life."



Jackie Pernell, a former marine and a Vietnam veteran, drives a Volvo for a company that hauls hazardous waste. He likes the truck – "It's built well, does well in the snow" – and he likes his job. "The pay is good, and I'm back home most nights. I've got it made."

to do preventive maintenance or a repair is one of their biggest challenges. Recently, Volvo's Advantage Truck Center in Charlotte, North Carolina, had 85 repair jobs on the schedule, with only 16 technicians to handle the workload. "All 85 of these customers are interested in how quickly we can get their truck out of the shop," says Randy Patton, Vice President of Fleet Operations. "They have loads they need to deliver and commitments they need to make."

While Mack and Volvo Trucks share many of the challenges that come with the US heavy-truck market, they have vastly different brand images.

Mack Trucks has a long history, dating back to 1900, and the Mack name is synonymous with durability and reliability. Mack is particularly strong today in the vocational industry, where the Granite model handles jobs like hauling concrete to a construction site. Last year, the Granite was the best-selling heavy-duty construction truck in the US.

Mack's strategy is to maintain its position with vocational customers but also grow in long haul with the Pinnacle model. "We're not looking to be all things to all people," says Stephen Roy, President, Mack Trucks North America. "We want to find our niche in long haul, with customers who value Mack attributes like reliability, durability and an unrivalled commitment to the success of their business."



Stephen Roy



Randy Patton

TODAY, VOLVO TRUCKS is a leader in long haul in the US and is known for driver efficiency and comfort, safety and fuel economy. Göran Nyberg, President, Volvo Trucks North America, says Volvo Trucks will defend its position in long haul but continue to reach out to customers with different needs, including



Melissa Moore, AMT (Automated Manual Transmission) Assembly Operator in Hagerstown

petrochemical, bulk and weight-sensitive transport. Volvo Trucks has also made strong gains in the auto hauler segment, taking a third of that business from the competition in the past year.

Both brands share a goal: record-breaking performance in 2015.

"Customers are telling us that today's Mack trucks are the best they've seen in 20 years," Stephen Roy says. "Customers we lost are coming back and potential customers who have never experienced the brand are showing interest."

On the critically important powertrain side of the Volvo Group truck business, the outlook is also optimistic. In late 2010, Wade Watson became head of manufacturing at the GTO Hagerstown plant where all engines and transmissions for trucks sold in the US, Canada and Mexico are built. The *mDRIVE* had just been introduced, but the I-Shift had been available for several years and sales were increasing. At the same time, more Volvo Trucks customers

were choosing Volvo engines over engines made by other manufacturers which meant even higher build volumes.

TO MEET THE DEMAND, the Hagerstown team transformed the plant through renovations and process improvements across the manufacturing operation. They visited other Volvo Group factories and manufacturing plants to learn everything they could about the Volvo Production System, Kaizen and similar efficiency tools. "We took the best of what we learned," Wade Watson says.

In May, Hagerstown opened its new line for final engine assembly, modelled after the GTO Powertrain plants in Lyon, France, and Skövde, Sweden. It was the culmination of four years of planning and work. The result is one of the most advanced assembly lines in the world. "We call 2015 our graduation year," Watson says, "but now we want to go for our master's level." ☉



Wade Watson, was previously the head of manufacturing at the Hagerstown plant. As from April he has a new assignment as Vice President and General Manager at the GTO Macungie Cab & Vehicle Assembly.



James Hatley is a technician with McMahon Truck Centers, which includes the Mack of Charlotte dealership where Hatley has worked for 50 years. "When I started here, Mack was just making the transition from gas to diesel," he says. "Trucks have changed so much since then, I wouldn't know where to start. But if I had my choice, I'd still buy a Mack truck any day over the competition."

Keeper of the brand

When Mack Trucks introduced a more modern look for its 115-year-old brand last year, including a new logo, some worried that Mack's long heritage as an iconic American truck brand would be diluted. Brad McMahon, Chief Operating Officer of McMahon Truck Centers, saw it in a different way.

"It's been fun to work with the Mack brand and be its keeper," says Brad McMahon, who has been part of the "Mack family" his whole life. His father and grandfather worked for Mack Trucks and now Brad and his brother Mike, the company's CEO, oversee eight dealer



Brad McMahon, COO, and Jim Competti, Marketing Director of McMahon Truck Centers

locations in five states. Last year, their Mack dealership in Charlotte, North Carolina, captured 44 per cent of the heavy-duty truck market for the region.

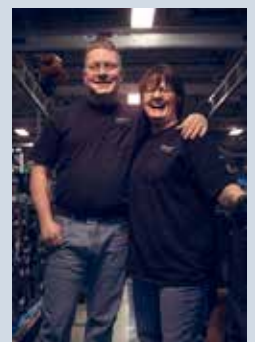
"The rebranding gives us the power of this historic brand but with a new and modern image," says Brad McMahon. "I'm excited to see us bring Mack to the next level."

All in the family

For 10 years, Dick and Laura Gordon have worked side by side building engines at the GTO plant in Hagerstown, Maryland. "It's good when you've married your best friend," says Dick Gordon. "We're together all day, every day, and we're both okay with that."

A few months ago their daughter, Kajin Bowers, also started working at the plant but on a different shift. She is on the same shift as her uncle Dave, Dick's brother, who also works on the engine assembly line.

"Now we're all making engines for big rigs," Laura Gordon says. "It doesn't get any better than that."





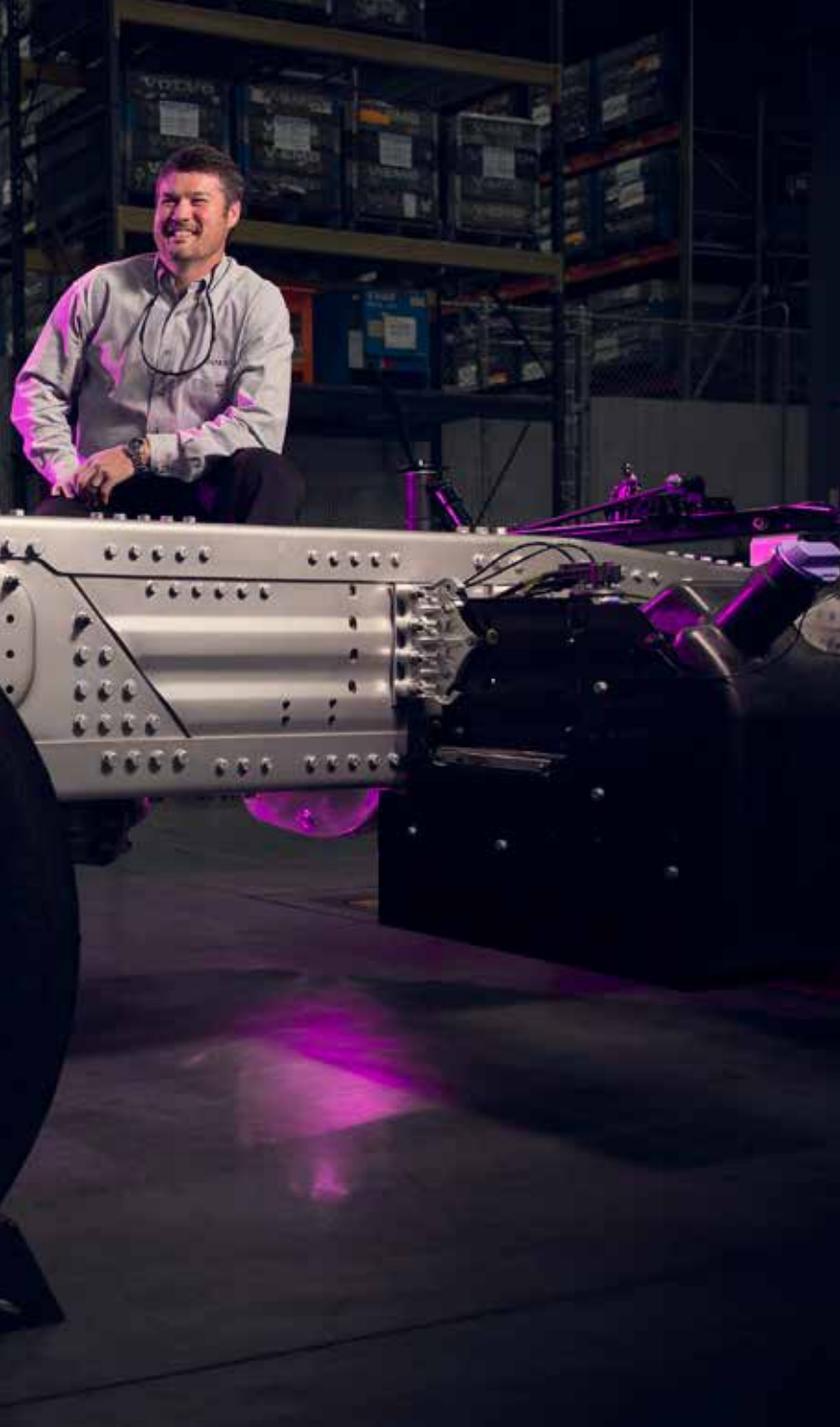
CUTTING EDGE – CUTTING WEIGHT

By re-examining every component of a long-haul truck – from the bumper to the back of the trailer, the tyres to the roof – a GTT team in Greensboro has been able to radically reduce vehicle weight as part of the SuperTruck project.

TEXT JANICE KIZZIAH PHOTOS NICKE JOHANSSON

AT THE GTT TECHNICAL CENTER in Greensboro, a truck chassis is parked in the workshop where technicians build and test prototype truck components. From a distance, it looks like any heavy-truck chassis, but get closer and you can see it has a dramatically different design. It's also made almost entirely of aluminium; only the bolts holding it together are steel.

The aluminium chassis is almost half the weight of a traditional steel chassis and it is only one of the



"I thought I knew trucks," says Keith Brantley, Project Manager, Advanced Complete Vehicle at Advanced Technology & Research, GTT. "Then I started to build one, a piece at a time."

many groundbreaking innovations resulting from the Volvo Group's SuperTruck programme in the US.

SuperTruck is a US Department of Energy programme aiming to develop technologies for long-haul trucks that will save fuel and reduce greenhouse gas emissions. Building trucks with lighter components is one part of the project, along with improving aerodynamics and powertrain efficiency. The goal is to make trucks that are 50 per cent more efficient – meaning more freight carried for less fuel – than trucks built in 2009.

Keith Brantley, Project Manager, Advanced



By using aluminium, the weight of the chassis is reduced to almost half that of a traditional steel chassis.

Complete Vehicle at Advanced Technology & Research, GTT, says this is the first time a research project has considered the complete vehicle, including the driveline and the trailer. He heads the 50-member Greensboro team, including GTT staff, suppliers and consultants, responsible for the lightweight segment of the project.

CUSTOMERS WILL SEE several advantages with lighter trucks and trailers, including the ability to carry heavier loads and use less fuel. Keith Brantley and his team focused on ways of reducing the weight without affecting safety, durability or the driver environment. The result: new designs and combinations of materials for many of the SuperTruck truck components.

"We haven't discovered any new materials," Keith Brantley says. "Aluminium, for example, has been used in the automotive industry for years. What we are doing with this demonstrator is using these lighter materials in new ways. We're finding applications that have never been explored before."

Using the lighter weight chassis will have the greatest impact on vehicle weight. To meet the aggressive SuperTruck goals, the Greensboro team looked to Volvo Trucks' chassis supplier, Metalsa, which has been researching lighter weight solutions for the past 10 years.

Pascal Amar, Principal Investigator at Advanced >

Technology & Research and the Volvo Group's SuperTruck team leader, says Metalsa was able to exceed the weight reduction target with its first chassis prototype. The aluminium frame is equal to or better than the steel frame in terms of performance. "They completely redesigned the frame and were even able to add new features such as modular construction and a wider front end," Amar says. "Frame rails have looked essentially the same for almost a century and this project reimaged them."

THE PROJECT TEAM has also focused on other components to cut weight. Saeil Jeon, Materials Specialist at Advanced Technology & Research, GTT, has been researching recycled carbon fibre and composite materials for everything from simple brackets to the entire cab roof. He recently tested thermoplastic skins filled

with foam for possible use in truck grilles. "Not everything we test will be used in the SuperTruck, but this work will help us evaluate what's possible for the future," he says.

Once the final chassis is complete, the Greensboro team will put the finishing touches to the Volvo Group's SuperTruck and it will be unveiled to the US Department of Energy in Washington, DC, in 2016.

BRANTLEY IS LOOKING FORWARD to the day the Volvo Group's SuperTruck will roll into DC for demonstration, but he says it will be hard to see the project end. "This is the most fun I've had in my 23 years here," he says. "It's nice to know exactly what you have to do and then deliver it. It's different from other projects, where you're trying to build 50,000 trucks a year. I'm just trying to build one truck." ☺



"It's our responsibility as the truck manufacturer to understand how these new materials impact safety, durability, the environment – everything associated with the truck and the driver," says Saeil Jeon, Materials Specialist.



"For the aluminium chassis, I see everything in 3D first and that makes it easier to see potential conflicts and take care of them quickly."

VICTORIA LINDSTRÖM

Victoria Lindström, Engineer and Vehicle Architect with consulting firm Xdin, handles the interface between chassis supplier Metalsa and the Volvo Group. "My job is to make sure the changes we're making to reduce vehicle weight are compatible with existing Volvo Group parts and new parts being introduced."

“We’re really pushing the envelope with this chassis.”

FRANCISCO GONZALEZ, DIRECTOR OF PRODUCT INNOVATION, METALSA

SOME WEIGHTY FACTS:

▷ Vehicle weight is key for customers hauling maximum payload, such as oil tankers and milk haulers. For some of these customers, the return on investment could be less than a year – despite the fact that the frame is built using aluminium, which is more expensive than steel.

▷ One success factor was the ability to go straight from a CAD model to a verified, full-scale prototype truck and skip costly hardware verification and prototyping iterations. This, along with other cost efficiencies, means the team will meet tough SuperTruck goals faster compared with some participants who are building their own trucks for the project.

▷ In addition to the Volvo Group, three other US industry teams are participating in the SuperTruck programme:

Navistar (International)

Daimler (Freightliner/Detroit Diesel)

Cummins/Peterbilt



Chassis supplier Metalsa is planning durability tests for its aluminium chassis using hydraulic actuators to simulate actual road conditions. “This is a revolutionary design,” says Francisco Gonzalez, Director of Product Innovation, Metalsa.



ACTIVITY ACROSS THE USA

The Volvo Group’s US presence stretches from southern states such as Tennessee and North Carolina to Pennsylvania and New York. Beyond trucks, this touchdown in the US presents integral business areas including finance, buses, boat and industrial engines as well as construction equipment.

TEXT LINA TÖRNQUIST



VOLVO CONSTRUCTION EQUIPMENT Paving the way to success in the US

The construction equipment market is nearing record levels for Volvo CE in North America. Backed by a strong economy, the North American market for construction machinery grew by 11 per cent in 2014, and 2015 also started strong. Volvo CE's sales are up as more roads and houses are being built, and oil and gas markets expand. In particular, the updated line of US pavers is winning praise from customers for their durability and dependability. 2014 saw the sales of Volvo CE pavers jump 69 per cent and market share grow by a hefty 4 percentage points, driven mainly by the new P7170 and P7110 models.

KEY FACTS

Number of employees in the US: approx. 1,000
Brands on the US market: Volvo, SDLG
Vehicle sales previous year: approx. 7,000
Dealers: 49 dealers with 252 locations all over North America



VOLVO FINANCIAL SERVICES Building relationships through face-to-face meetings

Volvo Financial Services (VFS) in the US works hard on building strong customer relationships with their partner dealers. One way they do so is through facility tours – the most recent of which took place in June. The tours are designed so that key financial personnel at US dealers get an insight into VFS's work and the support they offer through visits to its offices in Greensboro, North Carolina. “We shape our relationships with dealers through programmes like these which actively engage and educate our dealer finance managers,” says Stephen Yonce, Vice President of Truck Financial Services at VFS.

KEY FACTS

Number of employees in the US: approx. 200 VFS employees covering the US market
Key services: loans, leases and payment plans



VOLVO BUSES

Synergies bring business

For the past five years Nova Bus vehicles, historically manufactured in Canada, have been produced in Plattsburgh, New York. Since 2014, Prevost Commuter vehicles are also being built at the Plattsburgh plant. Manufacturing in the US has allowed the brands to gain access to the large US transit market and respond to public procurements. Working together has also created opportunities for joint proposals and strengthened customer service. In 2014, the Volvo Group won a public tender to produce 300 Prevost commuter buses and 400 Nova Bus city buses for New York City.

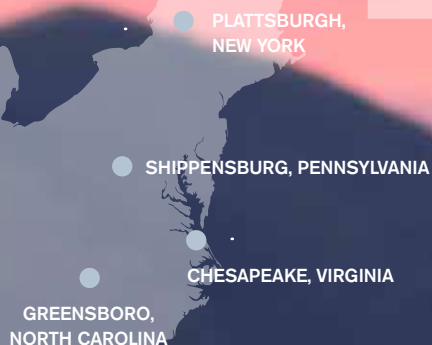
KEY FACTS

Number of employees in the US: 572

Brands in the US: Nova Bus, Prevost and Volvo

Vehicle sales last year: 537 (Nova Bus), 600 (Prevost), 67 (Volvo)

Market share: Nova Bus had a 12 per cent market share of the North American transit bus market in 2014. Prevost had a 30 per cent market share in the motor coach market and 100 per cent in the shell-for-conversion market.



VOLVO PENTA

Making waves with new products

Volvo Penta launched a range of new products at the start of 2015 in the US including the next generation of gas engines and the new Volvo Penta Forward Drive, which is a forward-facing drive system that pulls the boat through the water. The new product allows for an array of activities behind the boat, including wakesurfing and wakeboarding and opens up a whole new market for Volvo Penta. The Forward Drive won the NMMA Innovation Award at the Miami International Boat Show in February.



KEY FACTS

Number of employees in the US: 246

Number of independent US dealers: 1,496

Key products: marine and industrial engines (gas and diesel) 10-900 hp

KEEPING AN EYE ON THE COMPETITION

BUSINESS INTELLIGENCE IS an area of expertise organised under Corporate Strategy & Brand Portfolio. The purpose is to keep track of and analyse surrounding business and competitors.

Ann-Britt Sedig is a Senior Analyst working with Strategic Competitive Intelligence at the Volvo Group Headquarters in Gothenburg. She has been with the Volvo Group for 30 years.


"I have a network of colleagues within the Volvo Group and my main focus is our truck competitors.

I produce several reports and presentations, and also write about this topic in a monthly newsletter. We obtain the information from publicly available sources, in particular how the competitors present themselves in press releases and on websites. I also scan international daily media and trade press to find information. In addition we use information from research companies but conduct the analysis ourselves. To be critical of sources is naturally part of the job."



Ann-Britt Sedig

(The Truck and Transport newsletter is available on teamplace. Search for Business Intelligence on Violin.) ☉



The Volvo Group is operating in a highly competitive industry where efficiency is key. Cash flow and operating margins influence the ability to invest in future technologies and assessing what the competition is doing is vital to staying ahead.

TEXT ANN-MARI ROBINSON PHOTOS GETTY IMAGES

CONSOLIDATION TREND

Major global alliances and clusters are being formed by linkages and collaboration agreements between Asian and Western truck OEMs (Original Equipment Manufacturers). Several segments and brands are gathered under one umbrella and the different brand products are tailored to each market.

The Daimler Group, the Volvo Group and the Volkswagen Group are the three major automotive and commercial vehicles

clusters. They are all global players and technology leaders and have each teamed up with important local businesses in the marketplace to become the world's major truck producer.

A complicating factor when managing the brand portfolio, in the Volvo Group's experience, is that the partner companies have their own growth ambitions and that the jointly developed and marketed products will potentially appear in many markets.



A CLOSER LOOK

Here we take a closer look at one of the competitors, the Volkswagen Commercial Vehicle Group, as analysed by Business Intelligence.

TEXT ANN-BRITT SEDIG

THE INTEGRATION OF Scania, MAN and Volkswagen Commercial Vehicles has created a joint commercial vehicles group with a product offering covering all major segments. In 2013, Volkswagen completed a merger agreement with MAN and in 2014 it acquired full ownership control over Scania. Andreas Renschler, recently leader of Daimler's truck business, replaced Leif Östling as head of Commercial Vehicles within Volkswagen's Board of Management as of 21 February 2015. Renschler brings with him experience from Daimler's successful business model and product portfolio integration. The majority of synergy benefits are expected to

come from joint R&D, purchasing and sourcing components.

One of Volkswagen's most important ambitions within its trucks business is to implement a modular toolkit strategy for commercial vehicles with common components and systems, while maintaining distinct brand identities. The first major announcement on strategic co-operation was made in September 2014. From 2016, the gearboxes in MAN's TGS and TGX trucks will gradually begin to be supplied by Scania. Volkswagen CEO Martin Winterkorn confirmed the ambition to also develop a modular toolkit for the truck brands at Volkswagen's annual press conference. Next generation transmissions as well as engines, cabs and electronics will be jointly developed.

VOLKSWAGEN AG IS INVESTING MORE than any other company in research and development and the new Group gives MAN and Scania access to Volkswagen R&D and extensive research collaborations. Group Research with approximately 1,000 employees headquartered in Wolfsburg, Germany, is a common resource for all Group brands. Focus on recent patent filings is, according to Volkswagen, innovations in the areas of modular infotainment, driver assistance systems, alternative drive technology and intelligent lightweight construction.

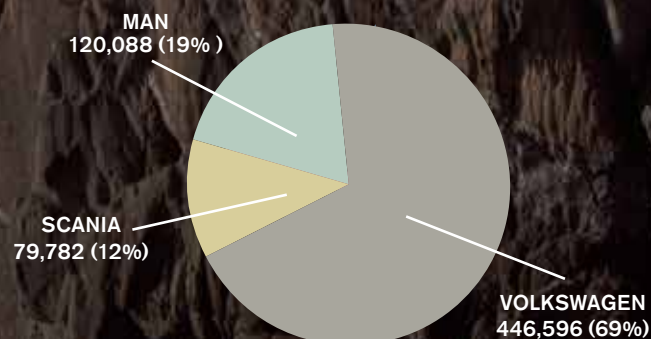


Both Scania and MAN have home markets in Europe and Brazil, but neither is present in North America. All three Volkswagen Truck Group brands are present in South America. Scania and MAN have invested heavily in Brazil and it seems they will keep their investment plan despite the fall in the market.

MAN has a significant presence in China where it owns 25 per cent of one of the major Chinese truck producers, CNHTC (Sinotruk). The SITRAK brand developed jointly by MAN and Sinotruk will also be targeting international markets. Volkswagen's excellent Chinese contacts, where VW has just extended its partnership with FAW by 25 years, will also benefit the Chinese expansion for the truck brands. Scania expects India to become one of its major markets by 2020. Scania and MAN have both set up assembly in Russia.

SCANIA'S STRATEGY IS TO TARGET strategic customers who can offer long-term partnerships and growth potential. Scania's European production system has been concentrated in Södertälje in Sweden, with Brazil as the other major hub. Scania's production system will be ramped up globally to 120,000 vehicles per year, although such demand is still not yet present. Scania's long-term goal of producing 150,000 trucks per year is still valid. MAN seems to have encountered a problem with too much capacity in its plants. ©

VOLKSWAGEN GROUP COMMERCIAL VEHICLE DELIVERIES 2014



VW Commercial Vehicles produce light-duty trucks; Scania is concentrating on heavy-duty trucks, while MAN produces trucks from 7.5 tonnes and up.

OPERATING MARGIN

Operating margins are important because they measure efficiency. The higher the operating margin, the more profitable a company's core business is. The Volvo Group's financial target is to be ranked among the top two companies when benchmarked against relevant competitors. For 2014, the operating margin in percentage was: Volvo Group (Industrial Operations) 1.5%, Scania 8.4%, MAN 2.8%, VW 5.9%.



THE WASTE HEAT IS ON

Automakers are exploring waste-heat recovery technology as one way to cut fuel consumption in their vehicles. At GTT, an advanced engineering team is leveraging global expertise across the Volvo Group, to address the technology's complex challenges. The results so far are promising.

TEXT LINA TÖRNQUIST PHOTOS NICKE JOHANSSON



The Hagerstown team
(from left): John Gible, Rick Ewan, Dan Ruth, Thom Horne, Pascal Amar, Jeff Huber, Tim Robertson and Rich Brandt

“This could be a breakthrough technology”

Nicolas Espinosa is a Combustion and Simulation Engineer at GTT in Lyon, where much of the technology development for the Rankine waste-heat recovery technology has taken place. He is a GTT specialist on waste-heat recovery and is workpackage leader of the second generation of the Rankine technology.

“This could be a breakthrough technology so it’s very interesting to work with it. When we started out, there were only a few specialists in the area at the Volvo Group but now there is growing enthusiasm and knowledge about it globally.”



I T SOUNDS SIMPLE. Redesign a system to convert heat to power, like one found in a common electrical power generation plant, for the powertrain of a truck. This is the basic idea behind GTT’s Rankine Waste Heat Recovery System, which converts excess heat from a truck engine into mechanical energy.

Nevertheless, this type of advanced engineering challenge is almost breathtakingly complex.

It involved not only designing the technology from scratch but also integrating the system into an existing chassis, then dealing with a host of system-level interactions with other technologies under development that affect fuel efficiency.

To succeed, the project team, led by John Gible, Advanced Engineering Chief Project Manager, ATR,

is leveraging the know-how of technical experts across the global Volvo Group at sites including Hagerstown, Greensboro, Gothenburg, Lyon, Malmö and Curitiba – drawing on the knowledge of a veritable engineering dream team.

THE RESULTS SO FAR are promising, says John Gible, who recently started testing the second generation of the technology, built by GTT’s advanced engineering team in Lyon and shipped to the Volvo Group’s US facilities.

“The first generation of the technology that was tested in 2013 was heavy, costly and unreliable, but gave a significant fuel economy improvement on the road cycle. The ambition with the second generation we are testing now is to be more reliable, less



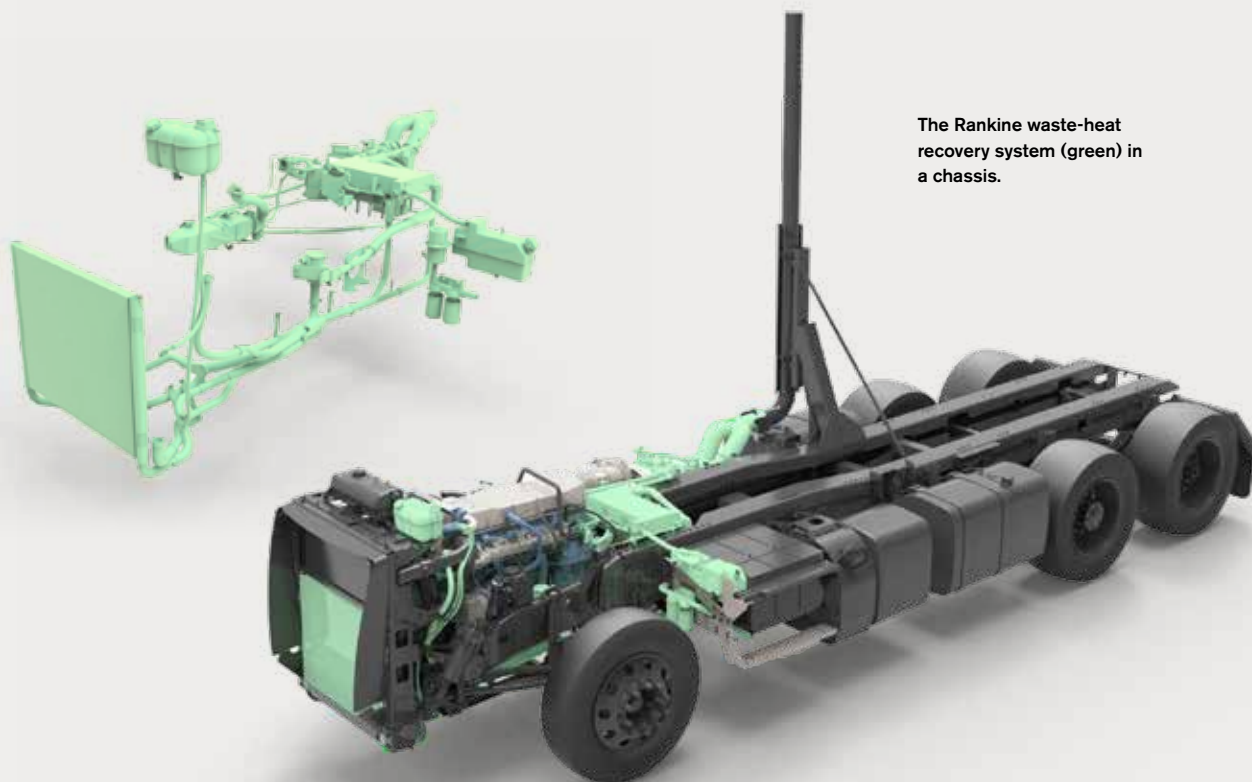


“This is why we become engineers. To take something as far as it can possibly go – to push innovation to the limit.”

JOHN GIBBLE, ADVANCED ENGINEERING CHIEF PROJECT MANAGER, ADVANCED TECHNOLOGY & RESEARCH (ATR)

VOLVO

The current research on waste-heat recovery technology has drawn on expertise from advanced engineering teams in Greensboro, Gothenburg, Lyon, Malmö and Curitiba.



The Rankine waste-heat recovery system (green) in a chassis.

expensive and have a lower weight, while achieving the same fuel economy," says John Gibble.

Although no auto manufacturer has yet introduced commercial vehicles with waste-heat recovery systems, most global automakers are investing heavily in research on the technology.

"Every automaker is taking a slightly different technical approach. But everyone is looking at this right now," says Gibble, "not only commercial vehicle manufacturers but also car companies such as BMW."

GTT'S ENGINEERS ARE pursuing a waste-heat recovery technology that converts waste energy from the engine into mechanical power. The energy is produced by a steam engine in a process that captures exhaust gas recirculation (EGR) and exhaust heat energy, which is otherwise lost. This is done by evaporating and condensing a fluid – a thermodynamic cycle similar to that in an air conditioner.

To make the Rankine system work in a truck, the team needed to deal with new challenges, such

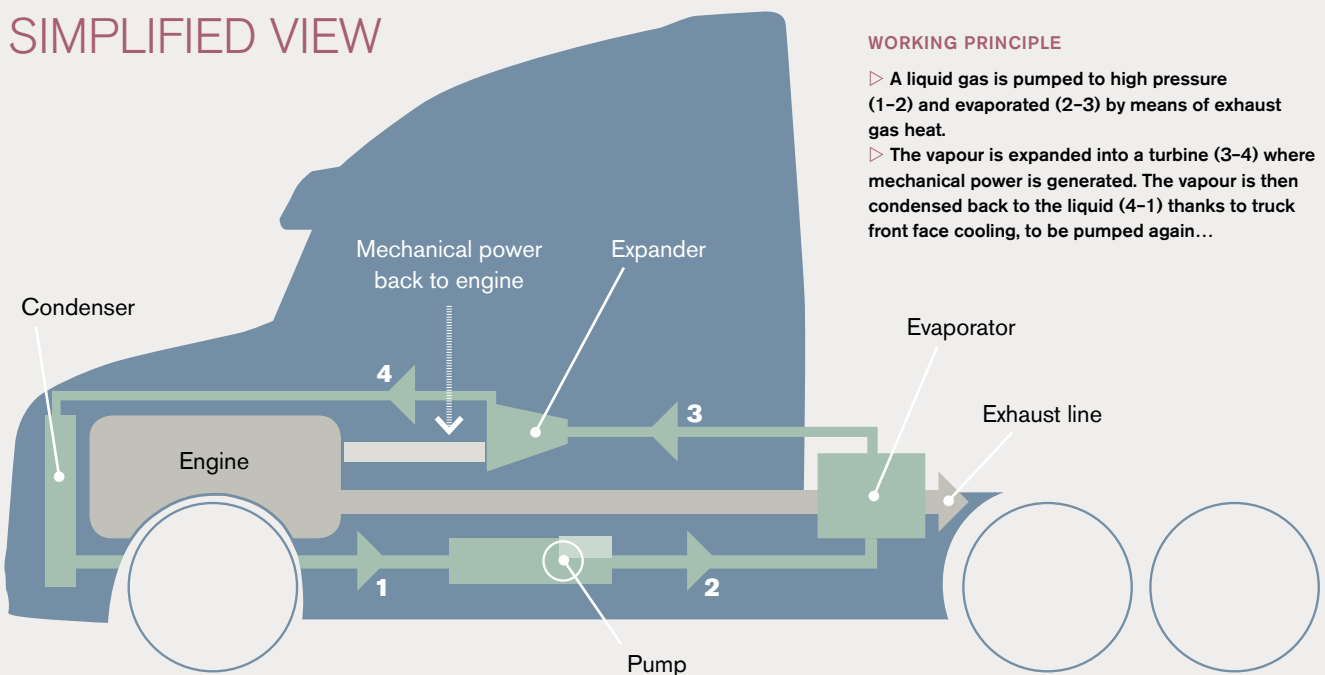
as the need for an extra radiator behind the front grille, which hurt aerodynamics.

They also discovered that if used to power a very aerodynamic and efficient truck, as can be expected in the future, a standard 13L engine does not need to work as hard and therefore does not get as hot as it would in a conventional vehicle. As a solution, the team is testing a waste-heat recovery system designed to fit a smaller engine, which works harder and so produces more heat.

"Due to the complex interactions between different technologies, this type of system-level, complete vehicle approach should be taken with every project," says Pascal Amar, Senior Project Manager at GTT. "It's crucial to see how a complex system like this works in an actual truck."

The complexity of a project on this scale is not only challenging but also exciting, says John Gibble: "This is why we become engineers. To take something as far as it can possibly go – to push innovation to the limit." ●

SIMPLIFIED VIEW



WORKING PRINCIPLE

- ▷ A liquid gas is pumped to high pressure (1-2) and evaporated (2-3) by means of exhaust gas heat.
- ▷ The vapour is expanded into a turbine (3-4) where mechanical power is generated. The vapour is then condensed back to the liquid (4-1) thanks to truck front face cooling, to be pumped again...

Creative Engagement



Some teams just seem to have it – that extra dedication to their work. But where does it come from? We talked to some co-workers from across the globe about what creates engagement in a team.

TEXT MARIA SKÖLD & NIC TOWNSEND

PHOTOS: DANIELE MATTIOLI



“Being helpful
is key to
success.”



Ting Liu and Charles Zhai have both been involved in the Internal Trainer Program at Volvo Financial Services in Beijing, China, where employees are encouraged to share their knowledge.

“In China, one of the major challenges for companies is to recruit and retain talented people. At Volvo Financial Services China, the average age of employees is just 31. They are young, well-educated and have strong career ambitions,” says Ting Liu, Director Human Resources and Communications.

To make good use of the high level of competence among employees, while also creating a new path for professional growth, the Internal Trainer Program was initiated last year. Ten employees were nominated to offer training sessions in areas relevant to their peers. Each was then trained on how to train others and received one-on-one coaching while developing their modules.

Charles Zhai, Regional Sales Manager, organised a very successful course in Construction Equipment Business Introduction

and liked the experience. “I felt it was mutually beneficial. Not only was I able to help my colleagues know more about our businesses, but at the same time I gained new skills when it comes to cross-functional communication.”

The internal trainers were chosen both for their expertise and for their attitude. “We were looking for people with a generosity gene, who were willing to share their knowledge with others. It is important for a company to create a culture of sharing. Being helpful is key to success,” says Ting Liu. >



“Often small gestures can be the biggest motivators.”

In Malaysia, Volvo Group employees now present ‘thank you’ postcards to their colleagues as a way of showing their appreciation for their efforts.

“Often simply saying ‘thank you’ can be the best recognition you can give someone,” says Carol Tong, Human Resources, Volvo Group Malaysia. “This is why we introduced the ‘thank you’ postcard recognition programme. It is a simple way to show appreciation to colleagues or to recognise each other’s help and contributions.”

The postcards are readily available to any employee and can be given to anyone else within the company. The sender simply needs to add the name of the recipient and a description of what they’ve done to warrant the postcard.

“It could be a significant contribution to the organisation, a exemplification of the Volvo Way, going the extra mile to achieve a target, or a helpful deed to assist your colleagues. The most important thing is to say ‘thank you’ from the bottom of your heart.”



“It’s all about people. They need to feel valued, feel they belong and feel they have a role.”



AZRA SELIMOVIC, DIRECTOR OF ELECTROMOBILITY SUB SYSTEMS

The Electromobility Sub-systems team is comprised of 16 people based in Gothenburg and Lyon and includes eight different nationalities. After a concerted effort to improve team engagement, they now have one of the best VGAS scores in the organisation.

“In the beginning, we had quite a poor VGAS score and I wanted to understand what the problem was,” recalls Azra Selimovic, Director of Electromobility Sub-systems. “I got some help from a corporate psychologist and began interviewing everyone in the team. We worked with a development coach to try and understand how we should work together. Who are we, what is our vision and how will we develop as a group? We then used this input to devise an action plan.”

As a result, engagement improved rapidly

and today Azra’s team has one of the highest VGAS scores at GTT. However, maintaining team engagement is a continuous process and something they follow up every year. “We have created an environment where we can speak openly,” adds Azra Selimovic. “It’s important to create an understanding of the team’s mission and each person’s role, but you also need to give people an opportunity to run their own actions as well, so that they feel empowered.”

“The key to team engagement is good communication and collaboration and being able to use each other’s strengths,” says Karin Carlsson, Senior Research Engineer. “One of the strengths of this team in particular is that we’re very flexible. We have seen a lot of changes, but we’ve always been able to adapt and we do it with a positive attitude. The first thing we ask is ‘what can we do to contribute?’”

“To feel engaged, people need to know there is value in what they do.”



Chandrika Shetty, Department Manager for IT Services in Bangalore, India, is one of over 200 Volvo Group managers to take part in a special internal training programme dedicated to employee recognition.

“Initially, I thought we were already doing enough when it comes to recognition, but the training showed us that there is a lot of value in offering informal recognition as well,” says Chandrika Shetty.

“For example, just walking around the workplace, taking an interest in what people are doing and letting them know they’re doing a good job.”

The Recognition Module originated within Process & IT during extensive internal changes to the organisation in 2013. The idea is to support

managers in maintaining employee engagement by sharing best practices and methods to ensure that employees feel recognised and valued. Since then, the module has been deployed beyond Process & IT into other business areas and many different markets. To date, over 200 managers in India, France, Poland, Belgium, the UK, China and Japan have been trained.

“The training was also a real eye-opener when it comes to the cultural differences in recognising people,” adds Chandrika Shetty. “In India, people tend to want public recognition. But in other countries, people prefer to recognise people privately. This is important to know in a global organisation like the Volvo Group.”

“But overall, we all want to be good at what we do, and feel that our contribution is valued.”

NEXT STOP:

ELECTRICITY



The opening of a new groundbreaking electrified bus route in Gothenburg will reinforce the Volvo Group as a global leader in electromobility. As cities all over the world move to electrified public transport, Volvo Buses is positioned to be a leading supplier.

TEXT MARIA SKÖLD AND NIC TOWNSEND PHOTOS ROBIN ARON OLSSON AND JONAS TOBIN



Malin Nyman, Project coordinator, oversaw testing in extreme weather conditions including in Almería, Spain, and in Hålleröd, Sweden (pictured).



Since March, eight Volvo 7900 Electric Hybrid buses have also been operating in Stockholm, as part of the EU's ZeEUS project.

SINCE JUNE 2015, the first Volvo-branded full-electric vehicles have been operating in scheduled public transport. In all, three full-electric buses and seven Volvo electric hybrids now service the new ElectriCity bus route in the Swedish city of Gothenburg, carrying an estimated 3,000 passengers every day. The eight-kilometre bus route has two charging stations at either end, making it possible for all buses to complete the route in electric mode while emitting zero emissions.

It marks a significant milestone in the Volvo Group's electromobility programme.

"ElectriCity is a fantastic demonstration, not only of our buses but also of the charging stations and infrastructure," says Jessica Sandström, who heads Volvo Buses' City Mobility team, which has been set up to help cities adapt to hybrid and electrical transport solutions. "A successful demonstration changes everything. People can see that the technology works: it is able to carry large volumes of passengers in real traffic, it's clean, it's quiet and it's reliable."

SINCE THE LAUNCH of the Volvo 7900 Hybrid in 2009, Volvo Buses has established itself as a global

leader in the field, selling over 2,000 hybrid buses worldwide. This has now been followed by the new Volvo 7900 Electric Hybrid – a plug-in solution that can be charged directly from the electrical grid, enabling it to travel longer distances in electric mode, thus delivering improved savings in fuel and emissions.

Currently, three Volvo electric hybrids are operating in scheduled service on Innovation Route 109 in the German city of Hamburg, while eight electric hybrids are in operation in the Swedish capital, Stockholm, as part of the European Union's ZeEUS project. The ElectriCity route is the third project to utilise the electric hybrid, and the first to use full-electric buses.

MANY MORE CITIES look set to follow. Edward Jobson, Environment Director Volvo Buses, notes that this is a major global trend. "More and more cities have targets for air quality, emissions and noise and most have 2020 or 2025 as their deadline for compliance. Therefore there will be a lot happening in the next few years as cities move to sustainable transport," he says.

In many cases, he believes cities will find that electric buses provide the best solution, since electricity is more energy efficient than other



Martin Davéus, from the company Magnum, adds the finishing touches to an electric bus that will run in Gothenburg, Sweden.

70%

of people in Gothenburg say they are disturbed by the level of noise in the city, according to a recent study by the Volvo Group.

75%

The reduction in fuel consumption and carbon dioxide emissions when using an electric hybrid instead of a conventional diesel bus. This is an estimated value on a 10 km route compared to Euro 6. The reduction in CO₂ is up to 90% if bio diesel is used.

VOLVO BUSES' ELECTRIC MOBILITY PLATFORM:

► **Volvo 7900 Hybrid:** A standard hybrid that uses the electric motor for start-up and low speeds, before switching to hybrid mode. Since its launch in 2009 and up until March 2015, 2,000 Volvo 7900 Hybrids have been sold worldwide, establishing Volvo Buses as a leader in the field of electro mobility in heavy vehicles.

► **Volvo 7900 Electric Hybrid:** Based largely on the 7900 Hybrid, except that it can be charged directly from the electrical grid. As a result it can travel longer distances on electricity, further reducing fuel consumption and emissions. However it also requires additional infrastructure, namely charging stations. Was officially launched in 2014. It is currently available for order, with serial production beginning in early 2016.

► **Volvo Electric Concept Bus:** At this stage, Volvo Buses' full-electric bus is a concept vehicle for the ElectriCity project in Gothenburg. The driveline is similar to that used in the Electric Hybrid but with much greater battery capacity. It has four batteries as opposed to one.



A GLOBAL TREND

- A growing number of cities around the world are committing to ambitious climate goals. Copenhagen has vowed to be carbon neutral by 2025.
- From 2020 onwards, the city of Hamburg is aiming only to purchase emission-free buses.
- From 2014, 60 per cent of all buses in major Chinese cities must run on alternative energy sources.
- Over 160 cities worldwide have

implemented bus rapid transit (BRT) systems. Volvo Buses has been supplying BRT systems for 40 years, the first in the Brazilian city of Curitiba.

► **ZeEUS (Zero Emission Urban Bus System)** is an EU project promoting the use of full electric solutions in urban bus networks. Innovative electric bus technologies are currently being tested in a number of cities.

alternative fuels, such as biogas. For example, the same amount of gas needed to power one bus can be used to generate enough electricity to power three buses. Furthermore, electric buses offer greater flexibility at a lower cost compared with fixed rail systems such as trams. The fact that electric buses are so quiet is also becoming increasingly important to many city planners.

"It is in the interest of the entire Volvo Group to drive the development of this technology," says Hans Ristner, SVP Volvo Group Strategy. "At the same time, we must understand that there is no one solution that fits everyone. Customers in different parts of the world have very different needs, which we must meet."

FOR THIS REASON, it is important continually to develop solutions that are technically advanced but also environmentally and economically sustainable. Hans Ristner is convinced that the issue of efficient transportation in major cities will become even more acute in the next few years, as an increasing proportion of the world's population live in cities. "The Volvo Group is ready to make a difference, with solutions that impact many people's everyday lives. To be able to contribute to society in this way is actually quite amazing." ☉

ELECTRIC POWER | IN CHARGE

Electric buses are one of the most exciting technological developments within public transport in many years. Here we learn why Volvo Buses decided to opt for fast-charging and lithium-ion battery solutions.

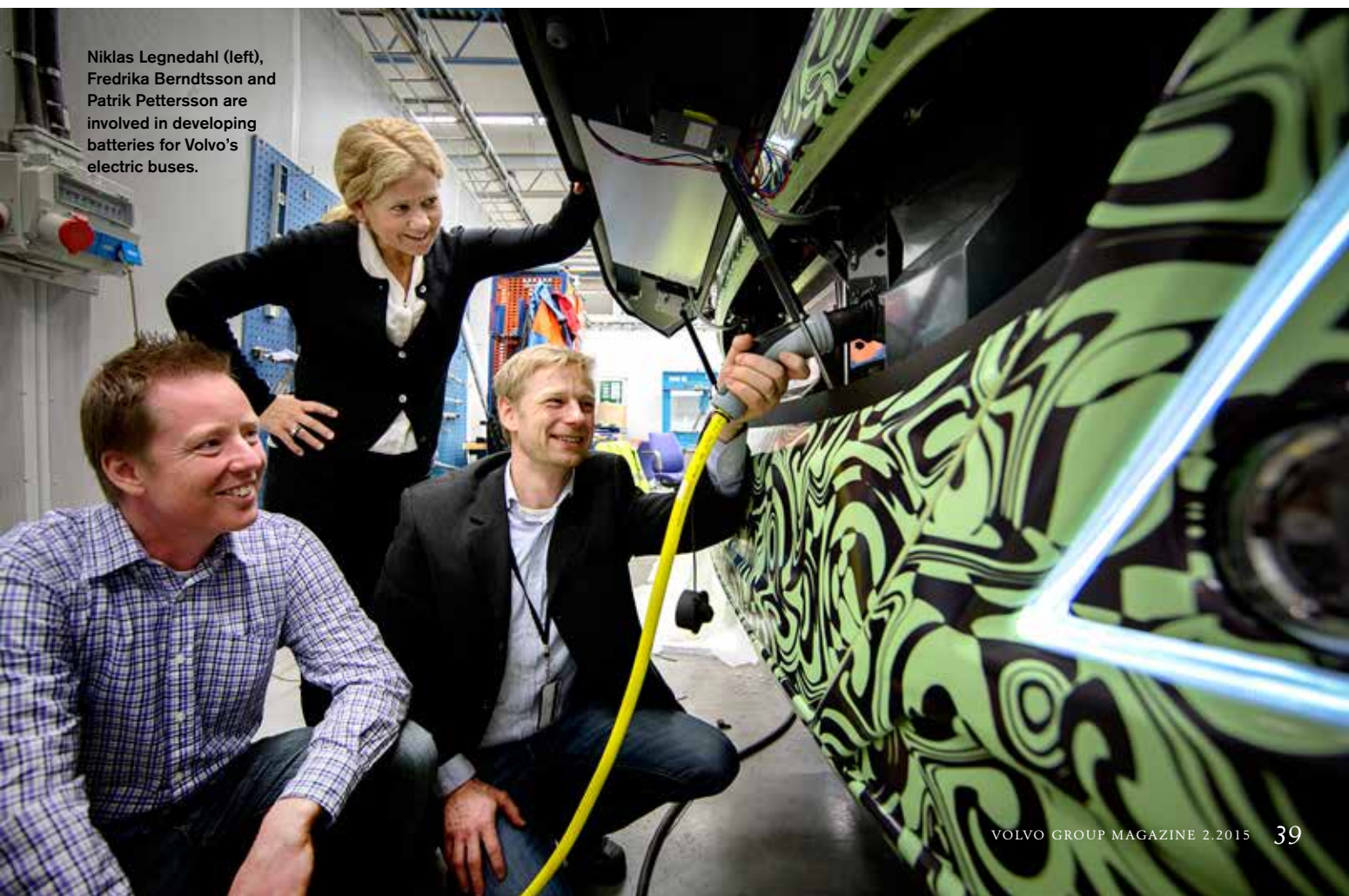
TEXT SOFIA ERIKSSON PHOTOS STEFAN EDETOFT

VOLVO BUSES' ELECTRIC HYBRIDS and full-electric city buses are new to the market. However, the choice of technology was made long ago, says Patrik Pettersson, Chief Project Manager at Volvo Buses.

"The Volvo Group was early in adopting hybrid vehicles. In the case of buses, it was the natural and cost-effective step in the development from hybrid to plug-in hybrid, to enable them to be fast-charged with electricity at the bus terminals. For charging, this is the best thing about buses – they drive on a predetermined route and always come back within a certain time," says Patrik Pettersson.

>

Niklas Legnedahl (left), Fredrika Berndtsson and Patrik Pettersson are involved in developing batteries for Volvo's electric buses.





Recharging the Volvo 7900 Electric Hybrid is as simple as parking under a charging pylon. Here at the production plant in Polish Wrocław.

With an existing infrastructure including charging stations on the routes, the next step is obvious – in some urban environments, it is important to have vehicles that run entirely on electric power, while in other cases hybrid buses are better. Everything is geared towards meeting a significant number of urban transport needs with a flexible, modular and environmentally sound solution.

The strategy was decided, but it was not until just before the summer of 2014 that the concept for the driveline was determined, after several different concepts were evaluated. Apart from an in-house concept, several others were considered, including one with two electric wheel motors and a Volvo Buses-owned Nova Bus.

“The decisive factor was a total of thirteen different criteria, such as battery life, LCC (Life Cycle Cost), product cost and energy efficiency. It then became clear that our in-house solution was by far the best,” says Fredrika Berndtsson, Chief Project Manager, Volvo Group Trucks Technology, who is

responsible for the delivery and development of the electric powertrain.

In addition, it was important to think long term and find a solution that benefits the entire group. “We are doing something that we do not see competitors do, namely aiming for an electromobility platform that meets the future needs of the Group which will function for trucks and construction equipment, for example,” she says.

THE ESS, ENERGY STORAGE SYSTEM, contains a large helping of in-house-developed functionality, says Niklas Legnedahl, Global System Responsible for the ESS battery at GTT.

“We buy the battery pack, but the control and functionality around it is our own. We are far ahead in this respect,” he says.

ESS has many advantages. It is so flexible that it is possible to switch to other types of batteries as technology develops. Plus, it works for both electric hybrids with a single battery and full-electric buses with



Fredrika Berndtsson, Niklas Legnedahl and Patrik Pettersson see great benefits in the chosen technology.



A battery recharge takes just six minutes.

“The decisive factor was a total of thirteen different criteria – and it became clear that our in-house solution was by far the best.”

FREDRIKA BERNDTSSON, CPM VOLVO GROUP TRUCKS TECHNOLOGY



four batteries. The battery chemistry is lithium-ion, with 192 cells connected in series. It is capable of a discharge power around 170kW and a total energy of 19kWh. The usable energy of 8.5kWh can be charged in six minutes after around half an hour's driving.

The batteries need to be replaced after four years in an electric hybrid and six years in a full-electric bus. This may sound like a short period, but it is in fact equivalent to a capacity of up to 60,000 kilometres a year.

ONE PARTICULARLY RELEVANT QUESTION about batteries relates to weight versus capacity. More cells provide greater capacity but also higher weight. Niklas Legnedahl is convinced that the lithium-ion battery solution is the best right now, but he emphasises that developments are ongoing.

“I’m sure that an even smarter storage medium will emerge. However, if you’re not on the intermediate stage of technology development, it is difficult to take the next step forward,” he says. ☉



DAWN OF A NEW ERA IN CHINA

The trend among major automotive and commercial vehicle manufacturers is to create global alliances where product, brand and pricing strategies are tailored to each market. The joint venture between the Volvo Group and Dongfeng is a milestone, as it is opening doors for both companies.

TEXT ANN-MARI ROBINSON

IMAGINE A FOOTBALL pitch where almost half belongs to one single team. This team has five players dominating 80 per cent of the game. What is more, you have just teamed up with the top player. Now replace the words pitch, team and top player with world, China and Dongfeng. Add the global strength and technical expertise of the Volvo Group and the potential is both evident and huge.

The Chinese joint venture supports the strategic objective for the Volvo Group's truck business to capture profitable growth in Asia Pacific. With Dongfeng Commercial Vehicles (DFCV), the Volvo Group is achieving a major foothold in the world's largest truck market and will benefit from co-operation in various areas such as transmissions

and engines. DFCV reported a pro-forma operating income of approximately SEK 1 billion in 2013 and it goes without saying that positive operating results from DFCV will benefit the Volvo Group.

DFCV will gain access to selected Volvo Group technology and aftermarket expertise and will benefit from the Group's experience in exporting to markets around the globe. So far, work on manufacturing the heavy-duty synchronised manual/mechanical transmission (SMT) has commenced through a licence agreement. Another area of interest and currently under negotiation is the technology and development co-operation involving an 11-litre engine.

The intention is that both the heavy-duty transmission and the future 11-litre engine will be



available for use in Volvo Group vehicles and for Dongfeng-branded trucks manufactured by DFCV.

"This market is huge, very competitive but steady. And we need to be here to be truly global. DFCV has a fairly small aftermarket and export business, these are areas where we can bring in our key competence to support. We are looking at seven feasibility projects, transmission and engine are two of them," says Claes Svedberg, Senior Vice President, China JV.

HE IS HEADING the China JV office in Beijing which is responsible for all contacts between the Volvo Group and Dongfeng. This includes preparing DFCV board meetings, handling negotiations and commercial issues, sourcing the right competences for agreed line functions and synergy projects and acting as the

interface between the two companies, securing that decisions are anchored at both ends.

"Dongfeng Commercial Vehicles was created early in 2013 by our partner Dongfeng (DFG) as a new Chinese company. Then all Dongfeng commercial vehicle assets were carved out from DFG's Nissan joint venture and transferred to the new company during the second half of 2013. Just imagine the complexity of separating factories, land, a head office and 28,000 employees from one joint venture and transferring all the people and assets to a new company. It is 45 per cent of this new company, DFCV, which the Volvo Group acquired in January 2015," says Claes Svedberg.

China is the world's largest truck market. Three of the five main players on the Chinese truck market





PHOTO: DANIELE MATTIOLI

Claes Svedberg

Claes Svedberg has worked for the Volvo Group since the early 1980s with several positions in Asia, Australia and Europe adding to his corporate resumé. He has been involved with the Chinese joint venture since the start of discussions in 2006 and has been heading the work once the master agreement between the two companies was announced in January 2013. He describes the process as complex but with good progress and collaboration between the two parties.

are partly owned by Daimler, the Volvo Group and Volkswagen through various joint-venture structures. The consolidation in the Chinese automotive industry is likely to continue, according to research by Business Intelligence. In addition, Chinese manufacturers are moving towards more advanced trucks and more attention to services.

“Traditionally, the main purchase criterion has been the price. However, we can see growing demand in China to provide quality products and sophisticated services in order to ensure uptime and reliability. The pressure of efficiency and the reduction of logistics costs are increasing as China transforms from a low-

cost production centre of the world to provide higher quality products and services,” says Gary Huang, President Dongfeng Commercial Vehicles.

What are the main priorities for DFCV in 2015?

“The number-one priority is to strengthen and consolidate our position as a leading truck manufacturer in the Chinese market. We need to secure the competitiveness of our products, we want to further develop our dealer network to improve service to customers and grow our aftermarket business.”

Several manufacturers continue expanding outside China with CKD (Complete Knocked Down)

TIME LINE

26 January 2013: The Volvo Group and the Chinese vehicle manufacturer, Dongfeng Motor Group Company Limited (DFG), signed a partnership agreement in which the Volvo Group would acquire 45 per cent of a new subsidiary known as Dongfeng Commercial Vehicles Co. Ltd.

6 January 2014: Approval from the National Development and Reform Commission, NDRC, an important step towards the completion of the transaction.

November 2014: Final approvals from the Ministry of Industrial and Information Technology, MIIT, and Ministry of Commerce, MOFCOM.



Christina Hallin

Christina Hallin is responsible for six subsidiaries, some fully owned by DFCV and some with a second owner. The companies develop, produce and sell trucks, superstructures and buses.

What are the main differences working at DFCV?

"Not being able to talk easily to people around me and not knowing practices and routines are the main differences. Personally, it is very rewarding in terms of trying to find ways all the time, no matter if it's a question of the quality on our products or understanding how to find a movie at the cinema with English subtitles. We are outside our comfort zone most of the time, which of course is both fantastic but also tiring."



Rajesh Mittal

As Head of Manufacturing and Quality at DFCV, Rajesh Mittal is building on his experience from the joint venture with Eicher in India. He is responsible for 13 plants and has identified

areas in which the Volvo Group's experience can contribute to a better result.

"The plants are modern, but there is room for improvement when it comes to production processes and quality at critical stations. We also need to work with the cost efficiency in low production months."

What is most important when working in a JV?

"My experience is to appreciate the differences and to be open to the other party's point of view."

DFCV MANAGEMENT

Four Volvo Group members make up half the DFCV management team; Bo Gustavsson (CFO), Jean-Noël Thénault (Export), Rajesh Mittal (Manufacturing) and Christina Hallin (Subsidiaries).



"The number-one priority is to strengthen and consolidate our position as a leading truck manufacturer in the Chinese market."

GARY HUANG, PRESIDENT DONGFENG COMMERCIAL VEHICLES

assembly in Africa, Latin America, Asia and Russia. Expanding the business in selected export markets and starting to build a global brand is also part of the ambition for Dongfeng Trucks.

"We believe the Volvo Group can be a great support in many of these areas when we go forward," says Gary Huang.

LAST YEAR, THE brand made its first ever appearance at the IAA Exhibition in Hanover and as the only Chinese entry in the Volvo Ocean Race 2014-15. This is part of the global marketing and brand strategy.

What potential do you see for Dongfeng Trucks?

"I believe over time we have a good chance to build a globally recognised brand if we follow our strategy and expand our business overseas step by step ensuring we can supply suitable products with good quality and that we have the capability to support our customers with sufficient service in accordance with customer expectations. Looking at the positive response we have received to our successful entry in the Volvo Ocean Race, I think this proves that, if we do things right, we will succeed over time to establish Dongfeng Trucks as a globally recognised brand," says Gary Huang. ☉

5 January 2015: Payment of acquisition price, approximately SEK 5.6 billion. The deal was closed.

26 January 2015: First DFCV board meeting, followed by an inauguration ceremony and press conference in the city of Shiyan, Hubei Province.

IN FIGURES

China's truck market

1

China is the world's largest truck market, representing about 45 per cent of the world market.

5

Five OEMs (Original Equipment Manufacturer) hold 80 per cent of the heavy-duty truck market in China. Three of these are part-owned by western companies.

The combined heavy- and medium-duty market share figures for China in 2014:

15%

DFCV
(Volvo Group owns 45%)

12%

Baic Foton
(Daimler owns 50%)

17%

FAW

16%

CNHTC (Sinotruk)
(Volkswagen/MAN owns 25%)

11%

Shaanxi

CHINA INDUSTRY

According to market research company Frost & Sullivan, China's logistics industry is to become the world's largest in 2016 with an increased need for transportation as a consequence. The expansion in highways is expected to go from 2.5 million kilometres in 2010 to 3.0 in 2020.

TRUCKS

987,000

The total volume of truck sales in China in 2014 reached 744,000 vehicles in the heavy-duty segment and 243,000 in the medium-duty segment – all together a total of 987,000 units.



INTRODUCING TEREX TRUCKS

Terex Trucks is a recent addition to the Volvo Group family of brands and was formally acquired by Volvo CE from the Terex Corporation in June 2014. Terex Trucks made its first international appearance at the construction equipment exhibition Intermat 2015 in Paris. The Terex brand has a solid reputation for producing robust and reliable haulers, going back as far as the 1930s.

Currently its product range includes five models of rigid haulers and three models of articulated haulers, all of which are manufactured at Terex's production facilities in Motherwell, Scotland, which was first established in 1950.

"In addition to organic growth, there has also been an opportunity for Volvo CE to fill product gaps via acquisition," says Martin

Weissburg, President Volvo CE. "Volvo CE's existing portfolio is suited to the quarrying and light mining segment – but it has long been clear that there was a rigid hauler gap in the product line-up."

The inclusion of Terex Trucks and its products closes this gap and greatly strengthens Volvo CE's position in the earthmoving and light mining segments.



The Terex Trucks product range currently includes five models of rigid haulers and three models of articulated haulers.

5

QUESTIONS TO STEPHEN STROUD AND ANNE LYSE RUIS BELLES, VOLVO GROUP HEALTH & SAFETY DIRECTORS

Providing a safe and healthy work environment is essential to business success. This is stated in the updated Health and Safety Policy.

1. What is the significance of the policy?

Stephen Stroud: "It's a big step for our work. We can say that this is not only a priority, health and safety is now actually part of the Group's core values. It really is a foundation for a global Group which is long overdue. And it might come as a surprise to many who thought we already had this in place".

Anne Lyse Ruis Belles: "We need to demonstrate that health and safety is on top of the agenda, to have the culture that we all care for each other at work. We believe all accidents are preventable".

2. How are we performing as a Group?

Stephen Stroud: "Compared with the industry benchmark, we are not the best and we are not the worst. One of our challenges is Sweden where the perception is that we are performing better than we actually are. The KPI we are measuring is zero lost time accident rate. We have managed to cover 86 per cent of the Volvo Group, so we now have the right conception going forward. In 2014, we had more than 1,000 people staying at home for one day after a work-related accident. We must work in a direction that this is never ever acceptable".

3. What areas are most critical?

Anne Lyse Ruis Belles: "Our plants and truck centers, where we have a lot of equipment and traffic. We can now offer Group guidelines and expertise as support, which is a great improvement. But we are also looking into psycho-social aspects of work, including stress".

4. What is prioritised in 2015?

Anne Lyse Ruis Belles: "We will link all people together who are working with health and safety, some 300-400 in total. We will set the right organisation with roles and responsibilities, build global guidelines, implement the minimum basic everywhere and train managers. We will communicate our policy in 20 languages, together with several other activities".

5. What is your message to co-workers?

Stephen Stroud: "We need to change the culture of acceptance. We aim for zero defects in the quality of our products – the same zero mind-set should apply to health and safety".

Anne Lyse Ruis Belles: "I want to raise the awareness that we are all responsible for our own health & safety. If you see anything that is wrong with your colleagues, first discuss with them and then raise the issue with managers".

ANN-MARI ROBINSON

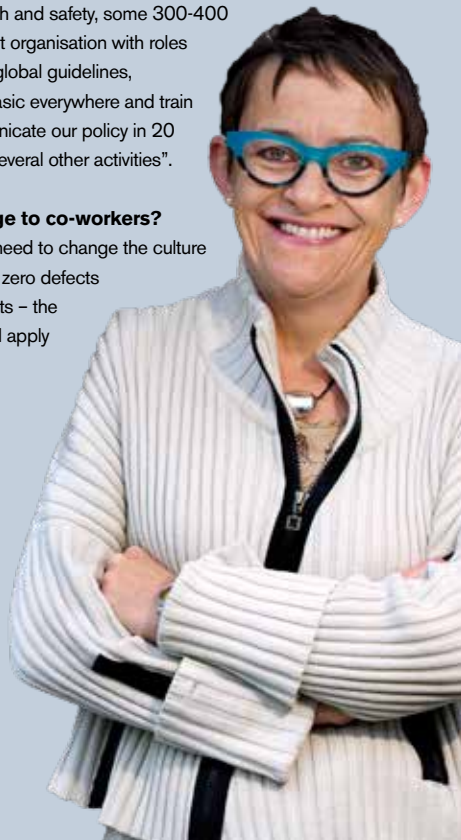


PHOTO: CICI JONSON



SAILS NETWORK



Millions of people worldwide have been exposed to the Volvo brand through the spectacular Volvo Ocean Race, which recently concluded in Gothenburg, Sweden. In addition, thousands of customers enjoyed product tests, seminars and events at each of the eleven ports along the way. We talked to some of these guests about their experiences.



"Everyone can enjoy Volvo Ocean Race"

"The Volvo Ocean Race is a very good platform for customer events. It's not only very visual and pleasant, I also like the fact that everyone can enjoy it, it doesn't require any previous knowledge. We always try to organise a host of interesting activities in association with the start of the race in Alicante. The theme varies from year to year, this time we focused on quality, uptime and future technology. Previously we have organised seminars related to environmental care and different product launches".

PATRICIA GARCÍA DE OTEYZA
MARKET COMMUNICATION DIRECTOR
VOLVO TRUCKS SPAIN



Jinseol Kim
CEO Jaail
Logistics, Korea
"Coming from Korea where sailing is not so popular,

this is a unique and exciting event to visit. The seminars on safety and uptime were very valuable and Volvo Group's focus on safety became very clear to me. I will be even more proud of my Volvo trucks now, after this event."



Mike Fritz
Divisional Manager
Truck & Bus, Al-Futtaim
Auto & Machinery Co.
LLC (FAMCO), UAE

"The Volvo Ocean Race is much more than just a boat race; it's a test of man's resilience, adaptability, sense of adventure and cutting edge technology tested to the extreme. This embodies the spirit and philosophy behind each and every Volvo and has made Volvo class leading in every segment it competes in."



Peng Yunxiang
Chairman of
Tongbao Group,
China

"I am inspired by the spirit with which the teams face challenges and difficulties on the ocean. The Volvo brand is very valuable to me as a business owner - it's recognised as a high-technology provider and the company as caring for the environment."



Rein Aav and Silja Aav
Herentes AS, Estonia
"Coming with Volvo Trucks to the Volvo Ocean Race is a great opportunity. We appreciate meeting others in the business, networking and really experiencing the Volvo brand."

The world's toughest sailing challenge

- ▷ The Volvo Ocean Race is the world's most prestigious offshore sailing race.
- ▷ The 2014-15 Volvo Ocean Race was 39,895 nautical miles long and lasted for nine months, from October to June.
- ▷ The race started in Alicante, Spain, and ended in Gothenburg, Sweden. In between, the teams visited South Africa, Asia, New Zealand, South America, North America and Europe.
- ▷ The race has been fully owned by Volvo since 1997.
- ▷ There is no monetary reward for winning the race. The sheer achievement and the Volvo Ocean Race trophy is reward enough for the winning team.

PHOTOS: GAVIN BLUE AND VOLVO GROUP



Natanphong Ratanasuwarthawee
MD SC Carrier, Thailand

"Taking part in the race event is very impressive. In Thailand we often compare the European truck brands and after this visit I think Volvo is in a totally different league."

LARS-ERIK FORSBERGH

What does sailing have to do with trucks?

WELL, FAR MORE than you might think, in fact. Customers who are invited to the Volvo Ocean Race are naturally initially delighted to be included in something this exciting. It is, after all, the most challenging round-the-world race in existence. When they look back, however, visitors experience so much more. They recall a perfect event, where everything was organised in the right way at exactly the right time. A competition in which nothing was left to chance and where quality and safety were always the focal points.

They remember an event that is quite simply characterised by the Volvo spirit. The Volvo Ocean Race is premium, just like our brand.

We are able to organise a competition of this calibre because we have a top-class organisation made up of loyal, skilled, target-oriented individuals. This creates confidence. We are able to show that we have not only the best products in the market but also the skills and expertise to organise our business and our service in the same professional manner. This message is passed on first and foremost by the enormous media interest in the Volvo Ocean Race.

THE VOLVO OCEAN RACE IS A fantastic opportunity and it is naturally important that we make full use of its potential. I am delighted that one of the stopovers in the Volvo Ocean Race was Abu Dhabi, as it enabled customers from the whole of the Middle East to participate in the race and all the activities linked to the Volvo Pavilion.

We also took the opportunity to hold our annual meeting with the region's importers in Abu Dhabi during the stopover. This was the perfect opportunity to plan activities for 2015, while absorbing the special atmosphere the Volvo Ocean Race created.

What is more, it felt particularly important that the employees also had the chance to experience the Volvo Ocean Race. For this reason, we transported all the co-workers at the office in Dubai to Abu Dhabi by bus, something that was really appreciated. The events associated with the Volvo Ocean Race were incredibly well organised and this is one reason for all the Volvo Group's employees to feel tremendous pride.

Lars-Erik Forsbergh
Managing Director
Group Trucks Sales Middle East



WWF co-operation cuts carbon emissions

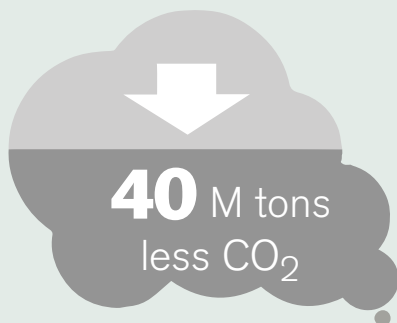
Carbon dioxide emissions from the Volvo Group's products and manufacturing decreased by 40 million tonnes during the period 2009-2013. This is the result of the Group's involvement in the World Wildlife Fund's, (WWF) Climate Savers programme.

The bar has now been raised and co-operation with the WWF renewed. In addition to reducing emissions from products and manufacturing, the Volvo Group will pioneer the development of reduced carbon emissions across the whole transport sector.

The agreement is unique in the automotive sector and the Volvo Group is the world's only automotive manufacturer who is a member of Climate Savers.

Carbon reduction is a priority area in long-term sustainability efforts. Improved road safety, fewer accidents and focus on training for workshop technicians in areas such as Africa are other important issues that will be addressed.

Learn more about the Volvo Group's long-term sustainable development efforts in the 2014 Sustainability report at www.volvogroup.com



VOLVO