



*Ladies and gentlemen,
and representatives of the media,*

Welcome to MAN at the IAA Commercial Vehicles 2008 in Hanover. At this, the world's biggest commercial vehicle exhibition, we'd like to present you our current range of products and wide selection of services.

MAN offers the most modern choice of commercial vehicles in all weight categories. We received due recognition of this by winning the "Truck of the Year Award 2008" for our heavyweight trucks of the TGX and TGS series. Their high-gloss radiator grille has become a distinguishing element in goods transport on the roads of many countries. Here in Hanover we're showing for the first time the re-engineered TGL and TGM series, which have also taken on the distinctive look of their big brothers. TGL and TGM also come newly equipped for more safety, comfort and convenience – examples are the electronic stability program (ESP) and the multifunction steering wheel.

A very special highlight at the MAN show booth in hall 12 are our new EGR engines for Euro 5. Right on time for introduction, MAN fulfils its promise to its international clientele of meeting the strict standard without any additive and elaborate exhaust after-treatment. What pleases me in particular is that these engineering masterpieces not only better the exhaust standard, but also show such a high level of efficiency and performance in doing it. Faced with climbing prices for diesel, I'm sure this is good news for our customers.

Proof of our successful focus on efficiency in transport, for the benefit of customers and our environment, can be found in further innovations that we're presenting at the IAA. The TGX EcoLion for instance, which comes to standard with TipMatic® gear shift, electronic stability program, differential lock and power DirectSteering, is the most economical semitrailer tractor from MAN for long-haul transport. Other highlights at the MAN booth include the new TGL distribution truck with hybrid drive, and the serial Lion's City Hybrid. This bus, due to appear on the market in 2010, consumes as much as 30 percent less fuel – evidence that transport efficiency from MAN Nutzfahrzeuge is not just a promise but solid fact.

I would like to invite you, as representatives of the media, and all visitors to the show to come and see us at booth B04 in hall 12. Find out about our latest engines, trucks and buses, and attractive services, benefit from our consulting, and talk to us about solutions for "Transport worldwide. Powered by MAN."



Yours truly,
Anton Weinmann
Chairman of the board of MAN Nutzfahrzeuge Group

Innovations for efficiency in transport – MAN at the 62nd IAA in Hanover 2008

- **Clean and economical too without AdBlue® – new engines with EGR technology embrace Euro 5 and EEV**
- **Curtain up for the new TGL and TGM – elegant design inside and outside, impressive standards of comfort, convenience and safety, EEV engines without AdBlue®**
- **Benchmark for economy – the new TGX EcoLion shows the way**
- **Maximized service for minimized cost – MAN TeleMatics present new functions at attractive rates**
- **Family with profile – MAN buses in a new, uniform optical look**
- **Reduced environmental impact on the road – NEOPLAN premium tourist coaches satisfy EEV emission standard**
- **Hybrid from MAN – alternative drives for city buses and distribution transport trucking**

The ambition to achieve greater efficiency in the road transport of persons and goods characterizes the appearance of MAN Nutzfahrzeuge in 2008 at the 62nd International Automobile Show (IAA). During the world's major exhibition of its kind, running from September 25 through October 2 in Hanover, the company is premiering a whole number of products, besides presenting its international selection of lightweight, middleweight and heavyweight trucks, city buses and tourist coaches, engines and services for transport operators. MAN products range from an efficient 7.5-tonner through to a highly modern heavy-haulage tractor for up to 250 tonnes gross vehicle weight, from city bus through to luxury tourist coach, from innovative common-rail diesel engines through to complex hybrid drives for buses and distribution trucking. With the introduction of its latest Euro 5 engines for all vehicle series – needing no AdBlue® additive – MAN makes a significant departure in the development of the diesel engine. And MAN comes along with an extra attraction – many of its engines now already

satisfy the even tougher EEV (enhanced environmentally friendly vehicle) standard.

Euro 5 and EEV engines do it without AdBlue®

At the IAA 2008 in Hanover MAN is for the first time showing an entire range of new Euro 5 and EEV engines. These MAN engines set up on the progressive common-rail series D08, D20 and D26. A focal point of the new engine generation is advanced, lambda-controlled exhaust gas recirculation (EGR) technology. In a combination of third-generation common rail, two-stage turbocharging plus intermediate and main boost air cooling and further improvements to combustion engineering, the new engines meet the strict Euro 5 exhaust standard and in most cases the, as yet, voluntary EEV standard too, and without the need for elaborate exhaust after-treatment based on SCR technology. The familiar low fuel consumption figures of MAN engines with EGR are still achieved at Euro 5 level. Advantages for the user are that they only fill up with diesel, and the prescribed low exhaust emissions are achieved without the AdBlue® additive. Plus the operator saves the space otherwise needed to install SCR exhaust after-treatment and the weight of the system.

TGL and TGM with fresh look and more

To mark IAA 2008 the lighter MAN truck series also take on the distinguishing look of the new Trucknology® generation, indicative of the thorough upgrade, outside and inside, of the MAN product range. Externally the MAN trucks come with improved aerodynamics and elegant lines. Internally the driver can look forward to high-grade seating and excellent ergonomic comfort. Under their bonnets throb powerful new Euro 5 engines with exhaust gas recirculation (EGR) and common-rail injection. These EGR engines can be had with the same performance to EEV standard too – something that no other commercial vehicle manufacturer can match. MAN is also ahead of the competition in this weight category

with its EBS braking system for more safety. Optionally TGL and TGM come with the electronic stability program (ESP) ready integrated.

TGX EcoLion – benchmarking efficiency in transport

In the TGX EcoLion MAN is premiering a vehicle concept in Hanover that consistently implements the demands of long-haul transport operators for minimized cost of ownership. With technical highlights like air pressure management (APM) to reduce fuel consumption, power DirectSteering, extensive standard equipment that includes TipMatic® and ESP, plus attractively priced add-on packages and customized services, the TGX EcoLion is MAN's most economical semitrailer tractor.

MAN buses in a new, uniform optical look

For the first time the MAN selection of buses appears at the IAA in a thoroughly uniform look, in the new MAN design with its modernized brand logo. Starting from the successful Lion's City bus series, the nose-end design of the subtle and traditional radiator grille ribbing is carried over to the other city and intercity bus and tourist coach models. Newly styled from front to end is the Lion's City low-entry city and intercity bus. All MAN buses, the Lion's City Hybrid too, are being shown at the IAA using uncomplicated MAN PURE DIESEL® engine technology, meaning that even tourist coaches can operate to the, as yet, voluntarily adopted EEV standard.

NEOPLAN tourist coaches debut with EEV engines

For the first time NEOPLAN premium tourist coaches Starliner, Cityliner and Tourliner are being shown at the IAA with powerful MAN common-rail engines meeting EEV emission standards. Thanks to MAN PURE DIESEL® engine technology, the operator of MAN and NEOPLAN buses needs no additives at all to satisfy the highest standards. On show are the

new three-axle Cityliner C and L, plus the Starliner L, which has forged to a lead in the tourist coach sector since it was launched in 2004.

The NEOPLAN Individual product offering will in future serve special customer requirements, either manufactured inhouse or in partnership with qualified finishers and bodyworkers. This will be demonstrated to the full at the IAA by a high-class Starliner exhibit with wooden floor and exclusive three-in-a-row seating. A constant in the NEOPLAN product mix, the successful Skyliner double-decker, familiar on Europe's roads for 40 years, plus a 13.26-meter version of the new NEOPLAN Tourliner round off the selection at the show.

Active and passive assistants

In the successful Trucknology® generation MAN is offering a range of vehicles with enhanced active and passive safety features. MAN provides the anti-skid and anti-tilt system ESP (electronic stability program) for a wide selection of trucks and buses, and adaptive cruise control (ACC) is available as an option to maintain the right distance from the vehicle in front. ACC automatically applies up to 30 percent of the maximum possible braking. The lane guard system (LGS) warns drivers if they accidentally drift out of lane. The turn-off assistant, a system with ultrasonic sensors that will be offered as an option on trucks from 2009, warns the driver about possible collisions with cyclists or pedestrians at road junctions. For this system MAN recently won the ADAC Mobility Award.

Hybrid competence from MAN

Two exhibits with different hybrid propulsion concepts are representative of how far MAN has advanced when it comes to alternative ways of powering commercial vehicles. In Hanover MAN is showing a Lion's City municipal bus with serial hybrid drive and ultracaps to store energy. Compared to a modern diesel bus the fuel savings of this bus, due to go into series production in 2010, are as much as 30 percent. Celebrating its

world premiere at the IAA is the MAN TGL Hybrid. The distribution transport truck, with parallel hybrid drive technology and advanced battery storage, promises up to 15 percent less fuel consumption.

Road haulage in the year 2020

At the IAA Commercial Vehicles Show MAN will be casting a look at the future of road haulage for the international public. In the middle of the MAN exhibition booth is the so-called Future Center, inviting interested visitors to a visionary trip into the year 2020. What new challenges will hauliers be confronted with in the years to come? How can the growing volume of transport traffic be handled economically, safely and environment-friendly? What effect will the mega-cities, emerging and expanding worldwide, have on the traditional flow of goods? How will their inhabitants be supplied with their daily needs? What does the one-liter truck look like? Are there alternatives to driving a truck on a diesel engine? When will we see emission-free trucks for delivery and distribution in cities? These questions and possible answers will be discussed by experts from research & development at MAN with the visitors, jointly devised ideas will be recorded and later evaluated. The aim is to promote a productive dialog between manufacturer, suppliers, customers and all those interested about the future of road haulage.

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MAN Nutzfahrzeuge writes a new chapter in diesel development – EGR engines for Euro 5 and EEV compliance

At the IAA 2008 in Hanover, MAN Nutzfahrzeuge is presenting new commercial vehicle engines that can dispense with AdBlue® additive to satisfy the tough Euro 5 emissions standard and the even stiffer, but as yet voluntary, EEV specification. These sophisticated common-rail engines are convincing in terms of high performance plus low fuel consumption. That makes MAN the sole commercial vehicle manufacturer in Europe offering Euro 5/EEV engines for lightweight, middleweight and heavyweight trucks that can manage without AdBlue® for full benefit from the handling and payload advantages.

This is another impressive demonstration of MAN competence in diesel engines. Right on time to mark the 150th birthday of Rudolf Diesel, who with the aid of MAN developed the engine named after him until it could go into series production, the new EGR engines for Euro 5 will be on show at the booth of the commercial vehicle manufacturer. These common-rail engines of the series D08, D20 and D26, with their innovative exhaust gas recirculation and two-stage supercharging, satisfy the tough emission standard without use of SCR technology. At the same time MAN has expanded its range of engines by versions that comply with the exacting EEV (enhanced environmentally friendly vehicle) standard – and that even without an additive in the case of the MAN series TGL and TGM and all MAN and NEOPLAN buses. EEV implementation of the heavyweight TGS and TGX truck series sets up on SCR engines.

Lambda-controlled exhaust gas recirculation and two-stage supercharging – advanced technology for greater transport efficiency and eco-friendliness

The strict Euro 5 exhaust standard and the voluntary EEV environmental standard are tough challenges for the engine designer – especially if they aim to do away with elaborate exhaust after-treatment using extra AdBlue® in favour of a smart and economical solution inside the engine. The solution arrived at by MAN engine designers to achieve Euro 5/EEV compliance is lambda-controlled exhaust gas recirculation (EGR) with recirculation rates of 30 percent and more, two-stage supercharging with indirect intermediate and main boost air cooling, plus common-rail technology with injection pressure up to 1800 bar.

The high EGR rate combined with improved cooling of the recirculated exhaust gas creates a lower temperature of the air/exhaust mix in the combustion chamber of the cylinder – the result is fewer nitrogen oxides in combustion already. The new EGR control using a lambda probe means that the optimal EGR rate is set for each operating point of the engine even in dynamic conditions. That guarantees especially high efficiency and extremely economical use of, in the meantime, expensive diesel fuel.

Supercharging of the new EGR engines for Euro 5/EEV is matched to the higher emission requirements, with the result that the customer can expect the usual high performance and low fuel consumption of MAN engines. In the case of the D08 engine series for the truck, the maximum supercharge pressure was increased to 4.0 bar (absolute); now the engines of 132 kW/180 hp and 184 kW/250 hp also benefit from two-stage supercharging. With the exception of the 110 kW/150 hp version, where weight and price are critical, all common-rail engines with EGR from MAN now feature two-stage supercharging. Two robust turbochargers in a compact supercharging module regulate the inlet air and boost pressure in two stages, and consistently use the energy contained in the exhaust gas. The high-pressure stage, a small exhaust turbocharger with waste gate, ensures speedy buildup of boost pressure and thus high pulling-away torque in the lower load and engine speed region. At low engine speeds already the high air ratio is produced that is required for combustion with

low particulate content. In the upper load and engine speed region the low-pressure stage ensures the necessary amount of air, and is characterized by especially high efficiency, resulting in very good fuel consumption and combustion with low particulate level.

The working of the two-stage supercharging can be described, in very much simplified terms, as follows: The exhaust gas flows from the cylinder head through the exhaust pipes to the high-pressure stage, and drives the high-pressure compressor by the high-pressure turbine. Through the waste gate valve, which opens at middling engine speeds, up to 30 percent of the exhaust gas is conducted direct to the turbine of the low-pressure stage – circumventing the high-pressure turbine – and drives it. The boost air goes the other way – it is intaken through the air filter and precompressed in the low-pressure stage of the supercharging module to 2.6 bar absolute. The high-pressure charger compresses the boost air further to 4.0 bar absolute.

The interaction of the two pressure stages also results in lower load on the single exhaust turbocharger. The vehicle operator also profits from proven MAN technology, which manages without complicated mechanisms compared to VTG chargers. The option for intercooling produces low boost air temperatures, and is an effective safeguard against carbonization of the exhaust turbochargers. In short: service life and reliability are significantly increased.

Low-temperature cooling system – for greater efficiency and lower component stress

To meet the higher cooling requirement of EGR engines for Euro 5/EEV emission standards, there is a low-temperature cooling solution depending on the particular vehicle and engine type. Cooling of the boost air between the turbochargers enhances the efficiency of the high-pressure compressor and reduces component stress. For this purpose part of the coolant is taken out of the engine cooling circuit following the water pump, conducted through a low-temperature cooler ahead of the engine radiator, and reduced to a few degrees above ambient temperature. After that the

coolant is split to the two strapped-down boost air coolers (low-pressure and high-pressure heat exchangers), and used to efficiently cool the boost air. Advantages of the system: there are no longer any voluminous boost air pipes to the front of the vehicle, and the space made available by this can be used to enlarge the radiator. Better boost air cooling is possible because of the high efficiency of air/water heat exchangers. At the same time the low-temperature cooler means a significant reduction in the noise radiated forwards.

Oxidation catalytic converter, PM-KAT[®], CRTec[®] – the clean end of the exhaust

Concentration on the combustion of EGR engines and enhancement of its working has enabled MAN engineers to reduce the raw emissions of Euro 5-compliant versions to such an extent that there is no need for elaborate exhaust after-treatment by SCR technology including use of the additive AdBlue[®]. To ensure a strict particulate figure of 20 mg/kWh, EGR engines for Euro 5 standard are fitted with an oxidation catalytic converter that is lightweight, compact and service-free. EGR engines from MAN need no closed particulate filter even to satisfy the more rigorous EEV standard. This is where the tried and tested MAN PM-KAT[®] surface filter is used. Robust and fully service-free, it has demonstrated its reliability thousands of times over in MAN Euro 4 engines. Which is one reason why this MAN development won the BDI Environment Award for Industry in 2005/2006. And to satisfy the especially high demands, in many cases politically motivated, of bus customers when it comes to particulates, EEV engines in city buses use the MAN CRTec[®] system with an integrated volume bulk filter.

A big upgrade for MAN TGL and TGM

The lightweight and medium-weight trucks from MAN have been completely revised for presentation at the IAA Nutzfahrzeuge 2008. The high-quality look on the interior and exterior is confirmed under the cabs by more powerful Euro 5 and EEV engines.

Three years after their launch, the successful MAN truck series TGL and TGM present a new profile. They now have the new family look, which matches the heavyweight Trucknology® series TGX and TGS. The MANs for light and medium-weight tasks have a friendly face. From a technical point of view, a lot of detailed aerodynamic work has been put in to minimise the drag and the wind noises. There are additional improvements to the structure of the cab: The doors of the cab have been given stronger hinges which had to withstand the increased stresses of the so-called shaker test.

The internal features are important to the driver

Generally the shell of the TGL and TGM cabs has been retained; they are the most spacious models on the market. New cover fabrics and trims upgrade the interior; the optional temperature-controlled seat with tempered airflow to the contact surfaces is recommended for long-distance drivers. All vehicle models have the attractive multifunction steering wheel (standard in L and LX cabs), and air-conditioning with automatic temperature control is offered as an option. Criticism about missing or too small stowage facilities no longer applies to the revised cabs. Everything can be correctly stored in the TGL and TGM – either in the door, on the dashboard or on the central console.

Squeaky clean – MAN TGL and TGM optionally in Euro 5 and EEV design

TGL and TGM have free access to inner-city environmental zones – MAN is the only manufacturer in Europe to present Euro 5 and EEV engines for the lightweight and medium-weight truck categories, which get by without additional additives and thus fully exploit their handling and payload advantages. The new D08 engines with exhaust gas recirculation (EGR), clearly the most competitive units on the market, are fired with optimised common-rail injection – a two-stage turbocharger with intermediate cooling is used for the more powerful variants from 180 hp. With its quick response it provides an improved starting performance and with higher charge-air pressures greater flexibility at high speeds. The six-cylinder units, which come with more torque and rated output, have undergone a distinct upgrading.

Customers whose vehicles drive through particularly environmentally sensitive zones can order MAN TGL and TGM which are even EEV certified. Upon request, the entire range of engines from the 150 hp four cylinder to the lightweight high-performance diesel with 340 hp meet the voluntary emission standard with the aid of the maintenance-free MAN PM-KAT®. At the same time the customer does not have to put up with any disadvantages in fuel consumption. The MAN engine designers have been able to continue improving the energy efficiency of the D08 common-rail engines thanks to the use of the third-generation common-rail system with higher injection pressure (1800 bar) and the new 9-hole nozzles with reduced nozzle discharge as well as the introduction of a so-called staged combustion chamber.



| | D0834 | | | D0836 | | |
|--------|---------------|-----|-----|-------|-------|-------|
| Engine | | | | | | |
| kW | 110 | 132 | 162 | 184 | 213 | 250 |
| hp | 150 | 180 | 220 | 250 | 290 | 340 |
| Nm | 540 | 700 | 850 | 1,000 | 1,150 | 1,250 |
| Euro 5 | EGR + Oxi-Kat | | | | | |
| EEV | EGR + PM-KAT® | | | | | |

MAN PURE DIESEL®

For the drive train, MAN is focussing its attention on new gearboxes. The 6-speed transmission ZF 6 S 800 OD is the specialist for light duties without trailer, while the 9-speed transmission ZF 9 S 1310 OD is standard equipment for the medium-weight TGM with more powerful engines and for towing trailers. Upon request, the MAN TipMatic automatic transmission offers ride comfort and effective relief for the driver for all types of applications - up to 220 hp engine output it shifts between six gears; in higher-powered variants the gearbox computer controls a 12-gear basic transmission. For utilities and the fire brigade, where MAN is one of the leading vehicle suppliers, there is the TGM with the 6-gear torque converter transmission ZF 5 HP 502. This transmission will be supplied in future through MAN-certified vehicle converters.

Progress takes place in many steps - for example the TGM all-wheel-drive vehicles have a climbing brake which holds the truck safely on an incline – only when the accelerator is pressed will the brake be released. Heavy three-axle TGM variants with overdrive transmission can be fitted with a short 5.29 axle ratio – the gear reduction provides additional tractive force in the case of increased driving resistance.

Safety with ESP

Nowadays, it is still not a matter of course for lightweight trucks too to be equipped with ESP safety equipment. MAN is the first manufacturer to offer an EBS braking system in this category, which upon request also integrates the ESP anti-skid and tilt protection system for solo vehicles. On the one hand it takes into account the high driving dynamics achieved these days by the high-powered eight- to twelve-tonners. On the other hand there are more and more vehicle combinations on long-distance haulage with an optimised weight, which from a safety point of view up to now were the odd ones out. MAN has also contributed to the compulsory wearing of seat belts - in the TGL and TGM the driver is reminded acoustically and visually about wearing the safety belt. The instruments have been taken over from the big brother TGS.

Reliable qualities

What has proven successful has been maintained in the MAN TGL and TGM. For example the good body-mounting ability: with an extensive range of wheelbases, a level top frame edge, a variable rear end and electronic interfaces for the body manufacturer. Sector-specific fittings are already available ex works. For refrigerated vehicles, there is the provision for the Frigoblock generator, for deep-freeze vehicles the refrigeration unit package, for bulk goods use the interface for the liftgate. Three-way tippers are offered ready for use, upon request also with a ready-to-assemble provision for the loading crane. Even the mounting plate for winter maintenance can be found in the sales department's list of options.

Efficient transport par excellence – MAN TGS and TGX

In autumn last year MAN Nutzfahrzeuge launched its two new truck series TGX and TGS. In addition to extra ride comfort, convenience and safety, their development aimed in particular at enhanced efficiency. With their improved aerodynamics, focus on lightweight construction and further optimisation of drive components, TGX and TGS consume up to four percent less diesel as well as emitting four percent less CO₂ than predecessor TGA.

Both the trade press and customers spoke in enthusiastic tones of the two new truck series, and an international jury of journalists voted the TGX and TGS "Truck of the Year 2008". They also won the prestigious "red.dot: best of the best" design award. But in particular the positive reaction and response of the many thousands of customers who already operate TGS and TGX daily are confirmation for MAN's engineers and designers that they have done their job well.

New in MAN TGX and TGS - Euro 5 engines with EGR technology plus EEV engines

The presentation of new EGR engines for Euro 5 at the IAA Commercial Vehicles show impressively demonstrates the lead of the two truck series TGX and TGS over the competition in terms of reliability and cost-effectiveness. In future the TGX/TGS customer can choose between EGR and SCR technology for compliance with the Euro 5 exhaust standard. The new EGR engines for Euro 5 generating between 320 and 440 hp are first choice for those customers who want to be independent of AdBlue® and the infrastructure and handling that go with it, who aim for maximum payload, or who need space on the vehicle frame for extra units that would otherwise be taken up by SCR components. A version of the TGX with 480 hp is due in 2009. However, for operators who already have SCR vehicles in their fleet and their own AdBlue® infrastructure, for example, TGX and TGS also come with Euro-5-compliant engines in reliable SCR technology as before. Both the powerful D26 engine with 540 hp and the

new model D2868 V8 diesel engine work with MAN AdBlue® technology for Euro 5 and EEV compliance respectively. MAN ranks among the pioneers in developing SCR technology, conducting its first successful field trials with customers back in 1995. The practical MAN system is restricted in terms of space to the volume of the standard silencer and a combined tank for diesel and AdBlue®. Specially for utility applications, MAN also offers for its heavy series the two D20 CR engine variants with 320 and 360 hp and EEV certification based on SCR technology. And even the powerful V8 diesel engine will in future bear the EEV label for enhanced environmental friendliness.

Euro 5 and EEV engines of the D20 CR, D26 CR and D28 CR series at a glance



| Engine | D2066 | | | | D2676 | | | D2868 |
|--------|-------|-------|-------|-------|-------|-------------------|-------|-------|
| kW | 235 | 265 | 294 | 323 | 323 | 353 | 397 | 500 |
| hp | 320 | 360 | 400 | 440 | 440 | 480 ¹⁾ | 540 | 680 |
| Nm | 1,600 | 1,800 | 1,900 | 2,100 | 2,100 | 2,300 | 2,500 | 3,000 |

| | | | | | | | | |
|--------|--|--|--|--|--|-----|-----|--|
| EURO 5 | EGR + Oxi-Kat MAN PURE DIESEL® | | | | EGR + Oxi-Kat MAN PURE DIESEL® | | | |
| EURO 5 | SCR | | | | | SCR | | |
| EEV | SCR | | | | | | SCR | |

¹⁾ 480 hp Euro 5 EGR engine for MAN TGX will follow later in 2009

The new TGX EcoLion – the efficiency benchmark in long-haul transport

Safety in transport and adherence to deadlines are decisive quality criteria in the haulage business. Against a background of constantly increasing costs, hauliers must consequently focus more than ever before on the economic efficiency of their vehicles. The biggest shares in total cost of ownership (TCO) are taken up by operating costs and the costs of driving personnel – even more than the actual investment in purchasing a vehicle.

In the new TGX EcoLion MAN is presenting a vehicle concept at the IAA 2008 that implements throughout the demands of long-haul transport operators for minimised TCO: through a very much expanded selection of standard equipment, highly functional and low-cost add-on packages, technical innovations to reduce fuel consumption and increase transport safety, plus customised services. The TGX EcoLion can consequently claim to be the most economical semitrailer tractor delivered by MAN.

Precisely tailored to long-haul transport

With the TGX EcoLion there is a choice of two cabs, both of which are equipped to satisfy even the most demanding drivers. The XXL, with the most space (10.46 m³) going in any cab in Europe, offers a maximum of comfort and optimal freedom of movement. With headroom of 2.1 meters, two beds and a whole variety of stowage and binning possibilities, even driver duos are sure of adequate convenience and space on long excursions. The XLX cab with one bed (optionally two) and a generous interior is exactly right for the fleet segment.

Generally the TGX EcoLion will come as a 4x2 semitrailer tractor with 3.6 metre wheelbase and leaf/air suspension. To power it there is a selection of high-torque and economical common-rail engines from the D20 and D26 series with 400 through to 540 hp compliant with Euro 4 and Euro 5 emission standards.

Fuel savings by air pressure management

The TGX EcoLion is the first MAN truck with the new air pressure management (APM) as a standard feature. This technical innovation from

MAN reduces fuel consumption, has a smaller CO₂ footprint and saves the operator money. In the TGX EcoLion this APM replaces the conventional air compressor, which continues to operate and use energy even when air tanks have the necessary pressure in reserve. APM on the other hand has a compressed-air-actuated multi-disc clutch between the compressor crankshaft and the drive from the diesel engine that disengages when cutout pressure is reached in the air tanks. Once compressed air is drawn from the tanks, the clutch engages and the air compressor again works up to cutout pressure. This APM reduces the turn-on time of the air compressor in long-haul transport by as much as 90 percent. The result is an average fuel saving of 0.5 litre per 100 kilometres. Given a kilometerage of 125,000 km/year, the saving adds up to no less than 625 litres of diesel, 1,625 kg of CO₂ and 781 euros for the fuel (based on a price of 1.25 €/litre). Further advantages of APM are that the air compressor has a longer service life, there is less oil spillage into the brake system, and noise emission also drops.

MAN TipMatic® as a no-cost extra

With the standard MAN TipMatic® gear shift, which features in the Fleet variant and only changes gear in automatic mode, the emphasis is also on fuel savings. This eliminates operator error, something which will be especially appreciated in large fleets and by rental companies in view of constant driver changes. Manual intervention is possible only when a vehicle is moving off, in overrun conditions and in the event of a system failure, while kickdowns on the accelerator – which increase consumption – have no effect. In this way fleet consumption can be reduced considerably, and even driving safety improves because demands on the attentiveness of the driver are far less in this permanent automatic mode. As an option for the more experienced trucker there is the familiar and proven MAN TipMatic® Profi variant which allows the usual manual intervention.

MAN DirectSteering

The MAN TGX EcoLion sits as standard on a modified 7.5-tonne front axle with single-leaf suspension, precisely attuned with a newly dimensioned torsion bar stabiliser. Improved response is the result of vertical incorporation of the shock absorbers, while the weight balance yields 46

kg higher payload compared to the former double-leaf suspension. A new component is the more direct steering, which produces an almost sporty driving feeling with its transmission ratio of 1:15.2 (1:17 before). The reduced steering play offers more precision and feel in the straight-ahead position, while only small turns of the steering wheel are needed to keep the vehicle on track and negotiate curves.

More safety and traction as standard

The electronic stability program (ESP) is a driver assistance system whose benefits to road safety have been verified beyond doubt by science. Almost half of all truck accidents (a truck alone and no other vehicle involved) could be avoided if all trucks incorporated such a stability program. ESP is a standard feature onboard the TGX EcoLion, making an important contribution to more transport and road safety. The extensive list of series equipment carried by the TGX EcoLion is rounded off by a differential lock, offering traction benefits especially on unpaved roadways and on snow and ice.

Extra packages for even better price/performance ratio

Extra to the expanded series equipment, customers can add value to their vehicles with attractively priced, optional packages composed exclusively for the TGX EcoLion.

Drivers will appreciate the Trucker Package, which contains numerous features that make working and living on board even more comfortable. These include an electric sliding/pop-up sunroof, roller sun blinds on both doors, a windscreen sun visor, a second dashboard drawer, a 12/24 V power outlet and a coolbox. The Trucker Package can be also added to suit market requirements in different countries.

The Value Package is a must in the operator's TCO calculation. The higher residual value means that the leasing instalment can be minimised. The package includes an intarder, heated Separ fuel filter, heated air dryer and preparation for a lifting axle on a semitrailer – thus creating the basics for higher resale value.

The Safety Package aims at increasing transport and road safety with the LGS (lane guard system) and ACC (adaptive cruise control) assistants. Studies conducted by independent accident researchers have shown that use of radar-based distance control systems reduces the risk of rear-end collisions on motorways by 71 percent, while an LGS will prevent up to 49 percent of accidents caused by a vehicle not staying properly in lane.

More efficiency and transparency in the transport process – MAN TeleMatics with new features

Customised services paired with leading-edge technology profile MAN as a leading international provider of integrated transport solutions. There is growing demand in particular for the telematics services offered by MAN. The continual cost increases facing hauliers adds to the pressure on them to find and tap extra potential for efficiency in the transport process. They are aided in this by the varied MAN TeleMatics from MAN | Support. MAN has substantially improved its telematics range of late and at the IAA 2008 in Hanover is presenting new and enhanced features for greater efficiency and transparency in road haulage.

MAN TeleMatics supplies the data essential for optimising vehicle deployment. Its capabilities range from tracking and tracing, vehicle deployment analysis and trip history through the exchange of text messages to complete job management and integration into existing dispatch systems. Display of the time left till the driver's next prescribed break, registered by a digital tachograph (DTCO), means extra planning assurance for a dispatcher.

Operating MAN TeleMatics only calls for a PC with Internet capability in dispatching. Data are exchanged between a vehicle and its base by GPRS – all over Europe at fixed rates. Trucks of the MAN Trucknology® generation can be delivered ex works ready equipped with MAN TeleMatics. Vehicles of other makes can be retrofitted.

New at IAA 2008 – driver smart card download and time left display

The new driver smart card download complies with legal stipulations concerning readout of the card regardless of a vehicle's location. By means of an external card reader (requiring optional hardware, currently available for Germany) drivers can send the data of their digital driver smart card over the air at regular intervals to a MAN TeleMatics center.

There the data plus digital signature are filed for up to 24 months. Driver card files saved in MAN TeleMatics can also be produced on a defined interface for other analysis and filing programs.

Display of the time left till a driver's next break on the FleetMonitor of MAN TeleMatics is additional planning assurance for the dispatcher, and of course it simplifies the monitoring of a driver's time at the wheel and prescribed breaks. A dispatcher can see at a glance whether or not a driver is able to undertake a trip. DTCO data for the time left till the next break are automatically sent from the vehicle at regular intervals. Additionally, the dispatcher can always actively query the remaining time till the next break.

The customer can choose between a national and international tariff and two equipment packages:

| Services | Data | Dispatch |
|---|-------------|-----------------|
| Technical vehicle deployment analysis with report | X | X |
| Maintenance data | X | X |
| Driving and standstill time display | X | X |
| Tracking and tracing | X | X |
| Geofencing (polygon and circle) | X | X |
| Release for sighting by third parties | X | X |
| Address management | X | X |
| Route planner with toll precalculation (D) | X | X |
| Logbook | X | X |
| Driver management | X | X |
| Time left display | X | X |
| Driver card download* | X | X |
| Messaging (bidirectional) | | X |
| Status messages | | X |
| Job messages, destination forwarding | | X |
| Job management | | X |

*Optional hardware needed; currently available for Germany

Data exchange between a vehicle and dispatching is GPRS-based and billed at a flat rate. The use of MAN TeleMatics consequently presents fixed costs.

MAN TeleMatics Cool – sure refrigeration right through

The lawmaker prescribes recording and filing of temperature data for every transport of refrigerated goods. When transporting fresh food too, a business must guarantee and document its quality. With MAN TeleMatics Cool it is possible to verify the entire cooling chain at any time and fully comply with food legislation and EU quality standards.

Data are collected by a black box connected to the interface of the cooling unit or temperature recorder. Door contacts can also be integrated. Data are automatically transmitted by GPRS. Analysis of the data can be called up direct from MAN TeleMatics. All data remain saved on the server for at least 18 months.

Bus engines from MAN - eco-friendly without additive

From city bus to touring coach, MAN is now able to offer engines of EEV emission standard. Heading the field from 2009 will be the D26 LOH, boasting all of 505 hp in the NEOPLAN Starliner.

MAN is now living up to its promise, and offering EEV (enhanced environmentally-friendly vehicle) engines for touring coaches that integrate its tried and tested MAN PURE DIESEL[®] technology. These engines - without using any additives - are well within the Euro 5 exhaust standard due to come into effect from October 2009. It called for the development and refinement of innovative engine technologies. They include exhaust-gas recirculation (EGR), optimised once again compared to Euro 4, with a new kind of control by lambda probe, and low-temperature cooling of the charge air. In addition, the third-generation common-rail system increased maximum injection pressure to 1,800 bar. Innovative two-stage supercharging has made it possible to cut raw particulate emissions to such an extent that these engines, compared to horizontal and vertical city bus engines of the type D20 LUH CR and D08 LOH CR, can satisfy the EEV standard simply with the service-free MAN PM-KAT[®].

The new EEV diesel engines are aimed at reliable compliance with exhaust-gas standards - plus optimal consumption - without any use of additives, loss of space through the incorporation of an SCR system or the resulting loss of payload. In the bus sector MAN PURE DIESEL[®] labels the MAN solution for purity without additives.

With the new vertical engines D20 CR and D26 CR for touring coaches, too MAN integrates the proven MAN PM-KAT[®], satisfying even the voluntary EEV standard as of 2009 without need for additives. The patented MAN PM-KAT[®] is entirely service-free and has exhibited an especially high separation rate for very fine particulates, making it particularly suitable for use in buses with routes in densely populated areas.

Mid-2009 will see the first use in the NEOPLAN Starliner of a 371 kW/ 505 hp engine from the D26 CR series. The six-cylinder, compliant with the EEV exhaust standard, will make the premium vehicle the most powerful coach on the market. Even though the torque remains unaltered compared to the 480 hp engine, the driver feels better response and pulling power because the maximum torque is available earlier. The new 505 hp engine will feature the service-free MAN PM-KAT® and innovative two-stage supercharging.

MAN bus engines with exhaust ratings Euro 5 and EEV

| Engine type | Exhaust standard | Type of use | Engine power (kW/hp) | Max. torque (Nm) | Exhaust gs cleaning |
|-------------|------------------|-------------|----------------------|------------------|---------------------|
| D0836 LOH | EEV | NL | 184/250 | 1.000 | EGR / CRTec® |
| D0836 LOH | EEV | NL, LE | 213/290 | 1.100 | EGR / CRTec® |
| D2066 LUH | EEV | NL, NÜ | 206/280 | 1.250 | EGR / CRTec® |
| D2066 LUH | Euro 5 | NL, NÜ, HÜ | 235/320 | 1.600 | EGR / PM-KAT® |
| D2066 LUH | EEV | NL, NÜ, HÜ | 235/320 | 1.600 | EGR / CRTec® |
| D2066 LUH | Euro 5 | NL, NÜ, HÜ | 265/360 | 1.800 | EGR / PM-KAT® |
| D2066 LUH | EEV | NL, NÜ, HÜ | 265/360 | 1.800 | EGR / CRTec® |
| D2066 LUH | Euro 5 | HÜ | 294/400 | 1.900 | EGR / PM-KAT® |
| D2066 LOH | EEV | SHD | 294/400 | 1.900 | EGR / PM-KAT® |
| D2676 LOH | EEV | SHD | 323/440 | 2.100 | EGR / PM-KAT® |
| D2676 LOH | EEV | SHD | 353/480 | 2.300 | EGR / PM-KAT® |
| D2676 LOH | EEV | SHD | 371/505 | 2.300 | EGR / PM-KAT® |

Type of use: NL - low-entry city bus
 NÜ - low-entry intercity bus
 HÜ – high-floor intercity bus
 LE – semi-low-entry city bus
 SHD - high-deck tourist coach

New vehicle generation MAN Lion's Chassis

MAN Nutzfahrzeuge is reworking its omnibus chassis from the bottom up. The name "Lion's Chassis" stands for a modular system of bus chassis with variants for city and intercity buses plus touring coaches.

MAN is one of the big brands in the international bus and coach industry. Choosing MAN means benefiting from the classic strengths of MAN engines and chassis. Omnibus chassis as well as complete MAN vehicles are very much in demand. On numerous export markets worldwide, MAN supplies local coach workers with the very latest in tried and tested omnibus chassis.

Bolted for quality

The IAA Commercial Vehicles in Hanover will see the premiere of a new, entirely re-engineered modular chassis family from MAN. Detailed market analyses and customer surveys were conducted in advance of development to determine the needs of the target groups, coach workers and end-users. The concept is based on a modular system. The modules are now preassembled and then bolted together. Tests in line with the latest MAN standards guarantee excellent quality and reliability. Each chassis variant is trialled as a completely assembled vehicle on the latest test beds as well as in elaborate track tests simulating a vehicle life of one million road kilometers. An increase in the gross vehicle weight of the two-axle configuration to 19 tonnes is MAN's logical response to greater demands throughout Europe for making better use of weight, especially in touring coaches. For some time now the legislation in a number of European countries has already allowed licensing up to 19 tonnes.

Lion's Chassis in five modules

The new omnibus chassis concept is made up of five modules. At the front is the ergonomically styled driver's workplace with pneumatically adjustable steering column and an attractive dashboard mount. The coach workers can position this quite flexibly in their bodies. The Lion's Chassis

comes for either left-hand or right-hand steering. There are three versions of the front axle module for different application needs: the proven and robust rigid axle for high-floor city buses and standard intercity or touring use, a low-floor axle for low-entry use, and a very modern multi-link independent wheel suspension for comfortable touring coaches. As a rule the chassis are produced with a transfer wheelbase to make for low transport costs, and the individual customer can decide what the wheelbase on the complete vehicle should be. Complete vehicles also benefit from variable body lengths of up to 14.7 metres.

For the driveline different axle modules are available with and without a trailing axle in which a single-reduction hypoid axle takes care of power transmission. On three-axle configurations there is also a choice of tandem axle modules for city bus and touring coach use. Both robust and comfortable, the standard power steering is the product of tried and tested commercial vehicle technology. Seated in the rear are new MAN common-rail diesel engines. Depending on the chassis type there is a choice of D08 CR, D20 CR (vertical and horizontal), D26 CR and E28 (CNG engine for 310 hp to EEV standard). With common-rail injection and exhaust-gas recirculation the engines' ratings range from 250 to 480 hp, making them suitable for all needs. These engines come in alternative versions for legal emission limits Euro 3 through 5. Engines are also available to meet the, as yet, voluntary EEV (enhanced environmentally friendly vehicle) standard. However, all diesel buses and coaches set up on a Lion's Chassis, like all complete MAN and NEOPLAN buses and coaches, will tank conventional diesel and use proven MAN PURE DIESEL® technology - the user can continue to dispense with additives for exhaust after-treatment.

Technologies plus

A foundation for the modern chassis and drive components is the TEPS (twin electric platform system) architecture with a defined interface for the coach worker. The multiplex system considerably reduces the amount of cabling, while connections in the wet areas use a proven seal technique. The entire system integrates onboard diagnostics that can be read out in

any MAN workshop by MAN-cats II®. All chassis feature a modern electronic braking system (EBS) and disc brakes on all wheels. An example of masterful system harmonisation is the MAN BrakeMatic, which coordinates the functionality of retarder, engine brake and service brake. A Lion's Chassis customer can be sure of maximum safety in critical situations thanks to integrated ESP (electronic stability program) - the vehicle remains manoeuvrable and will not break away. This is the first time on the chassis market that this assistant for safety enhancement has appeared as standard in touring coaches and intercity buses. And it is proof of the sense of responsibility and reliability of MAN when it comes to safety in commercial vehicles.

Industrial quality

Lion's Chassis are manufactured at the new chassis competence center in Salzgitter - new production and logistics processes assure the high quality demands made of the new chassis range from MAN. Many of the components used originate from the larger commercial vehicle series - meaning a wealth of experience to guarantee high reliability, long service life and economy.

The new MAN Lion's Chassis range

| Type | Use | Engine rating kW/hp | Body lengths | Permissible gross weight |
|---------------------|---|--------------------------------|---------------------|-------------------------------------|
| LC 19.xxx LE | City bus, low-entry, 2-axle | 184/250- 235/320 | 11 - 13 m | 19 t |
| LC 25.xxx LE | City bus, low-entry, 3-axle | 235/20 - 26/360 | 13.4m - 14.7 m | 25.7 t |
| LC 19.xxx IC | Intercity bus, city bus, high-floor, 2-axle | 213/290 - 265/360 | 11 m - 13 m | 19 t |
| LC 19.xxx CO | Touring coach, 2-axle | 294/400 - 353/480 | 11 m - 13 m | 19 t |
| LC 26.xxx CO | Touring coach, 3-axle | 323/440 - 353/480 | 13.4 m - 14.7 m | 26 t |

Designation system

| | | |
|----------------------|------------|------------------------------------|
| Example LC 19.xxx LE | LC | Lion's Chassis |
| | 19 | Permissible gross weight in tonnes |
| | xxx | Engine rating in hp |
| | LE | Low-entry |
| | IC | Intercity |
| | CO | Coach |

New uniform look of MAN buses

For years now MAN and NEOPLAN buses have been setting standards in all classes, not only with respect to innovative technology, but also with respect to modern design. Three times already the MAN Bus Division was able to obtain high rankings among the best ten enterprises, and once among the first three in the area of transportation with respect to the number of design prizes won per year. Among these was also the five-time title of "Bus/Coach of the Year". Three times MAN has won the "iF Award" and six times the "red dot design award", the last time for the NEOPLAN Cityliner – and here for the first time MAN won in the category "best of the best". Particular attention on the MAN side was aroused by the new generation of coaches, MAN Lion's Star and Lion's Coach, which illustrate a real paradigm change with respect to design at MAN. It is about getting away from the box-like, square-edged forms and moving towards the softer curves of a dynamic and elegant design which is welcomed by the passengers who, in the best sense of the phrase, are "really taken for a ride". The worldwide success of these series with more than 3,000 vehicles sold shows that MAN has been on the right track with its modern design concepts.

Since 2004, the successful low-floor city bus MAN Lion's City has also been provided with its own modern image. This holds true for the single-level solo bus as well as for the double-decker. For the first time in 80 years, this latter bus is now being produced largely by MAN itself and not by external coachbuilders. The modern design of both models was given the renowned iF Award right after their market introduction in 2004, and the solo bus was voted "Bus of the Year 2005". Beside a general reworking of bus details and an overall more attractive, sculptured form, these buses feature a completely new rear design similar to that of touring coaches. They also have lighting elements that extend far into the engine compartment flap and large windowed areas that extend up to the roof roundings. The windows are very easy to clean and result in a very harmonious, smooth and continuous lateral appearance.

The most striking feature of this modern MAN "design language" for the bus is the front panel, which has been sculptured and extended to cover

the full distance between the headlamps. With its subtly painted ribbing, this front panel bridges the gap between traditional and modern designs, and not only to the MAN and Büssing brands, but on the visual side also to the Truck Division. In the same way, the typical MAN trapezoid-shaped stud located in the middle above the ribs is used as an optical separator between the front panel and the windscreen, emphasising a further characteristic of the MAN bus family.

This front panel, which is distinctive for the bus brand and has been widely accepted on the market, will be introduced at the IAA 2008 for all series of MAN buses as a unique design characteristic supporting brand recognition. For the first time, the front panel also contains the adapted and modernised chrome MAN logo, which exemplifies in graphic form the high market value of one of the leading commercial vehicle manufacturers. The more discreet “Lion of Braunschweig“, part of the Büssing history and a classical, traditional style element, is crowned by the newly styled MAN lettering, which communicates an image of both vigour and modernity. This means that the current re-positioning of the Bus Division within MAN also expresses itself in a very graphic manner through a uniform, homogeneous “family face” throughout all bus series. The motto for this could be: “One family face to the customer”.

At the end of June the MAN Lion’s Regio intercity bus was voted “Intercity Bus of the Year” in the readers’ poll organised by ETM Publishing (Germany) for the fourth time in a row. Beside the MAN touring coaches, the Lion’s Coach and the Lion’s Coach Supreme, the variants of this successful intercity bus range too will be getting the new front design. In this way, the close technical relationship between the MAN intercity buses and the MAN touring coaches is again highlighted, and the high-class design becomes a clear buying incentive. For the touring coach’s top version Lion’s Coach Supreme this front panel, besides being adorned by the above-mentioned ribs, also has high-class, end-to-end chrome trim at the upper edge, which again emphasises the superior design of this sophisticated model. In connection with the shiny aluminium sickle of the B-post and the altered front panel appearance in the roof area, this results in a harmonious luxury-type look for the high-class Lion’s Coach Supreme. In addition, the Lion’s Coach Supreme has also adopted the A-posts

running elegantly from the roof rounding to the front of the bus, which are typical for MAN buses. These have the same surface colour as the coach body and serve as an additional family characteristic, thus enhancing brand recognition.

New design also for MAN Lion's City

As the third series, the low-floor city bus MAN Lion's City LE, introduced in 2004 and manufactured in the Ankara plant, is also being adapted to match the current brand appearance. This becomes quite clear too in the new, functional name Lion's City LE, as in "Low Entry". The standard bus is available not only as a city bus but also as an intercity bus, the "Lion's City LE-Ü", with a conventional and therefore very economical high-floor rear section. It has been adjusted to its low-floor brother, the Lion's City, and in this way considerably upgraded. In the interior, the most recent insights into driver ergonomics have been implemented in the driver's workplace and many details have been carefully adapted. In the same way as low-floor vehicles, the Lion's City LE can be equipped with the well-known and popular MAN driver's workplace, which is currently installed in about 40 % of low-floor vehicles. Furthermore, many smaller improvements were made in the interior and now make this vehicle a real alternative for the cost-conscious and design-oriented fleet operator.

Beside the front design, which is largely identical with the low-floor vehicle and differs only with respect to the vehicle height, the lateral design with the optically lifted windows and the back view with its elegant lines and surfaces have also been adjusted. Just as in the low-floor vehicles, both optional LED lamps at the rear and series daytime driving lights integrated in the front headlamps have found their way into the Lion's City LE too. The modern city and intercity buses have been available since 2007 in the form of a second-line offer with the vertical MAN D08 Common Rail engine rated at 280 hp. Starting in 2009, with the introduction of OBD 2, the engine output will be increased to 290 hp in what is currently the best emissions quality – according to the EEV standard – using the additive-free MAN PURE DIESEL technology.

NEOPLAN – the benchmark for individual touring coaches

Award-winning Cityliner series now complete

At the IAA 2008 show NEOPLAN is demonstrating its decades-old competence in touring coaches in the form of three complete ranges of individual and top-quality vehicles. In 2007 the company already launched the two three-axle variants C and L of the new Cityliner high-deck coach, and can now present them at the IAA Commercial Vehicles 2008 as fully-fledged members of the NEOPLAN family. The team bus for the football club 1st FC Cologne was already the 400th model of the successful new generation when it was delivered in June 2008.

The new Cityliner L is a world premiere and highlight at the IAA. Like the shorter three-axle model, it shows the typical, compact NEOPLAN rear end. In early 2007 the whole series was the first range of buses to receive the international "red dot: best of the best" design award. 13.99 metres long, the Cityliner L offers luggage compartment volume of some 11.5 cubic metres and seating for as many as 59 persons in the three-star version. The second NEOPLAN premium series is thus complete and offers the demanding customer a diversified range of models for de-luxe tourism. This long-distance coach also comes with the powerful MAN D26 common-rail engine and incorporates all the equipment and safety features of the small and compact Cityliner C: electronic stability program (ESP) as standard, adaptive cruise control (ACC) and lane guard system (LGS) as options. A further aspect of NEOPLAN's all-round safety policy is electronic comfort drive suspension (CDS), which even in normal driving conditions ensures optimal road contact and body stability and is currently being ordered in about 40 percent of three-axle vehicles.

This electronic CDS, specially modified for coaches, basically functions in a similar way as in trucks, but here it is designed to achieve increased comfort and indirectly to further increase safety. This is ultimately connected with the physical conditions of the vehicle concept, which does not react as strongly to rolling motion as a truck. In the coach too it is

possible to choose between two comfort levels, which are manually activated and influence the basic damping. In this way the vehicle can be matched to particular load situations or driving conditions.

The Cityliner L also features an actively steered trailing axle (EHLA), which in the meantime has become standard for competitors, and optionally the new D26 common-rail engine. Like all MAN and NEOPLAN touring coaches, the Cityliner is driven by the new and powerful 6-cylinder inline turbodiesels of the MAN D2066 CR or D2676 CR series, all complying with the voluntary EEV standard with MAN PURE DIESEL[®] technology and no additives, and thus already performing better than Euro 5. The power spectrum of these highly efficient engines ranges from 294 kW/400 hp in the D2066 LOH CR through 324 kW/440 hp to 354 kW/ 480 hp in the D2876 LOH CR. Modern common-rail technology produces unrivalled torque of up to 2,300 Nm at 1,900 rpm. Independent tests carried out by trade publications confirm that the CR engines are also very low on consumption.

NEOPLAN individualised

With its exclusive fittings, the Starliner L shown at the IAA is the expression of a new product line for an established NEOPLAN philosophy. The 13.99-metre-long vehicle with its NEOPLAN "Individual" equipment presents an especially high degree of customisation. The three-in-a-row seating is mounted on a level floor of smoked oak, adding an even more exclusive touch to the impressive interior of the Starliner. It is also very easy to clean and very resilient. Besides the standard featured, innovative surface sound system, this vehicle boasts 8-channel audio for maximum listening pleasure for every passenger. This is enhanced by the NEOPLAN Mediapack with iPod and USB interfaces. NEOPLAN intends to expand this exclusive equipment and extend it to other model ranges too. At the IAA there will be an "Advanced Craftsmanship" booth at which customers can see close up how their individual NEOPLAN is created. Such fitting out is handled either direct at the NEOPLAN plant in Plauen, in which all Starliner und Cityliner coaches are to be manufactured and finished in future, or by specialised and qualified fitters and bodyworkers.

Top-rated engine with 505 hp for NEOPLAN Starliner

As a special highlight the Starliner on show, as the first model of the NEOPLAN series, is offering a new engine from mid-2009 from the MAN D26 common-rail series for all of 505 hp to EEV standard, a compact 6-cylinder for low fuel consumption into the bargain. This premium vehicle will be the most powerful coach on the market. The torque remains unaltered compared to the 480 hp engine, but the driver feels better response and pulling power because the maximum torque is available earlier. Like all other engines this top-end Starliner engine features a service-free MAN PM-KAT[®] and innovative two-stage supercharging, producing the best acceleration at both high and low engine speeds. Experts have repeatedly confirmed that higher possible performance of an engine contributes to lower overall consumption especially when it is heavily loaded. This engine consolidates NEOPLAN's leadership in the premium tourist coach segment, as well as reinforcing the reputation of MAN engine competence worldwide.

NEOPLAN Tourliner and Skyliner make their firm showing

Another NEOPLAN innovation for 2008 is the 13.26-metre variant of the middle-class tourist coach Tourliner C, which can hold just as many passengers in much shorter length than the Tourliner L in the 4-star version, and is especially manoeuvrable on its short wheelbase. At the IAA itself the classic is on show with a length of 12 metres. The Tourliner has become a common sight on the roads – a perfect combination of durable and reliable MAN technology with self-assertive NEOPLAN design. The vehicle at the IAA runs on a D20 common-rail engine rated at 400 hp, likewise to EEV standard with new additive-free MAN EGR technology.

A Skyliner C with a length of 12.44 metres rounds off the range of models at the IAA Commercial Vehicles 2008. The tourist double-decker, built over 2,500 times, celebrated its 40th birthday in 2007, and can now also be ordered with the lane guard system (LGS). ESP has featured in the series vehicle since 2004. This second length, extra to the 13.79-meter-

long double-decker variant, ranks in the meantime as a unique selling point for a German manufacturer and is particularly suited for mountainous regions with tight-radius curves. MAN is committed to this vehicle concept, which 40 years ago triggered off development of a whole class of coaches. At the IAA 2008 the company is consequently giving a foretaste of the successor to the NEOPLAN Skyliner, which will be available mid-term with the very latest MAN chassis, power train and bodywork technology in an exciting NEOPLAN design.

MAN bus engines for NEOPLAN tourist coaches

| Engine type | Emission standard | Engine power (kW/hp) | Max. torque (Nm) | Exhaust gas cleaning |
|--------------------|--------------------------|-----------------------------|-------------------------|-----------------------------|
| D2066 LOH | EEV | 294/400 | 1,900 | EGR / PM-KAT® |
| D2676 LOH | EEV | 323/440 | 2,100 | EGR / PM-KAT® |
| D2676 LOH | EEV | 353/480 | 2,300 | EGR / PM-KAT® |
| D2676 LOH | EEV | 371/505 | 2,300 | EGR / PM-KAT® |

Hybrid technology from MAN on the way into series – MAN Nutzfahrzeuge focuses economical solutions

Two exhibits with different hybrid propulsion concepts are representative of how far MAN has advanced when it comes to alternative ways of powering commercial vehicles. In Hanover MAN Nutzfahrzeuge is showing a Lion's City municipal bus with serial hybrid drive and ultracaps to store energy, as well as a TGL model distribution truck with parallel hybrid drive plus the latest battery technology.

Given the worldwide increase in the cost of fossil fuels, more attention is focusing on hybrid drive technology, especially in the development of commercial vehicles. MAN sees prospects particularly in municipal transport and distribution. Hybrid powered vehicles can burn substantially less fossil fuel, thus contributing to greater transport efficiency and alleviating the problem of CO₂ in the environment. MAN is a pioneering force in the development of alternative drive concepts – its engineers have been working since the 1970s on different technologies for utilization of braking energy. To date the solutions came to nothing because of their complexity, a barrier against cost-attractive implementation. The new MAN low-floor Lion's City Hybrid bus will soon go into series manufacture. And the MAN TGL Hybrid for use in distribution transport is also shaping up as a highly promising approach.

MAN Lion's City Hybrid – accelerating on braking energy

Municipal transport is an ideal scenario for the use of braking energy. Here vehicles of up to 18 tonnes are driven at middling speeds, accelerating no end of times to between 40 and 50 km/h, only to slow down shortly afterwards for a stop. Conventional buses convert a large amount of kinetic energy into heat when they brake and it is consequently lost, while the Lion's City Hybrid can accelerate away from a stop purely electrically on its stored braking energy. City buses spend about 40

percent of their time at stops, where an optimized system for stopping and starting can save expensive fuel. In the Lion's City Hybrid MAN has created a whole package of measures to produce very respectable savings. MAN's engineers reckon with a 25 to 30 percent fuel saving plus substantially reduced emissions. Proof of this was delivered by the results of some 35,000 kilometers driven without any appreciable problems by the current test vehicle and its predecessor model in regular line service in Nuremberg. To produce exact data, conventional vehicles of the same performance and payload operated a reference service. The MAN Lion's City Hybrid is also suitable for second-generation biofuels, meaning a further improvement in its CO₂ footprint.

Phlegmatized diesel as basic engine

This low-floor MAN bus is based on serial hybrid technology. A largely standard D0836 six-cylinder in an EEV version rated at 191 kW/260 HP and integrating a CRTec particulate filter produces the energy for the high-power generator, which in turn supplies electric power to two conventional electromotors. The two strapped-down asynchronous driving motors each deliver 75 kW through a summation gearbox to the standard low-floor portal axle. In this way the unsprung masses are kept low, and the electromotors are spared impact on the axle. The energy storage system is located on the roof. It consists of 12 modules of high-power capacitors, each of 24 cells, that store the braking energy in highly concentrated form but only briefly. The driving motors can be powered either from the diesel generator unit or the energy storage system. In this way the Lion's City Hybrid can pull away from a stop just by electric power and without generating emissions, and only activates the diesel until when it needs more power. Low levels of power, needed to supply auxiliary units or the onboard network for example, can usually be drawn from the energy storage system. Cutting out and starting of the diesel engine is controlled by the automatic energy management. While the bus is travelling, the diesel engine, in addition to delivering the required driving power, produces power on demand for the electrical auxiliary units depending on the available charge in the energy storage system. The air conditioning compressor and power steering pump are driven electrically, unlike in a purely diesel bus. The six-cylinder runs in an optimal operating range. The engineers speak of a phlegmatized diesel engine, also contributing its

share to reduced fuel consumption with an exemplary low level of emissions.

More than economical with ultracaps

The advanced technology of the ultracap storage system obtains its energy from the braking operation. Driven by the brake pedal, the electric brake delivers as much as 150 kW to energy storage. The driving motors now serve as generators, converting the braking energy into electric energy when the bus next pulls away. This, in about 80 percent of the cases, is purely electrical to start with. Then the energy management decides whether to cut in the diesel engine in addition. In critical driving situations the standard EBS service brake of the Lion's City is electronically activated, but otherwise spared.

The major differences between ultracaps and other means of energy storage such as batteries or flywheels are their particularly high power density, power capacity, reliability and efficiency. Unlike batteries no chemical conversion is involved in charging and discharging, electric charges are simply shifted. The absence of moving parts and complete freedom from maintenance add to the notable cost-effectiveness already being achieved. The capacitor solution also comes out on top in terms of weight – the low-floor bus can save the bother of a heavy battery pack and now weighs about the same as a city bus powered on natural gas. A further reduction of the internal resistance produced a dramatic decrease in the storage losses of the ultracap system, and a marked increase in storage efficiency. Not forgetting that through the improved, active air cooling the service life of the high-power capacitors can equal that of the vehicle itself.

The Lion's City Hybrid is rewarding in use for its operator. Driving performance satisfies upscaled expectations. Not surprising given torque of as much as 800 Nm that the two electromotors can produce from a standstill. Only a few concessions have to be made in an everyday conveyance scenario, the interior and passenger capacity are largely the same as in the basic vehicle. The substantial fuel savings help cover the extra cost of the bus in about five to six years. A further plus is that the emission-free and electrically powered pulling away makes it attractive for

the installation (or re-installation) of bus stops in residential areas where they might otherwise provoke criticism from the environmentally minded. Next year already, a small series is going on the road with selected operators. Proper series start of the Lion's City Hybrid as a solo bus is scheduled for 2010. While an articulated bus is due for presentation one year later.

MAN TGL 12.220 Hybrid

– parallel hybrid for middling distances

Typical distance profiles in goods distribution are made up of a mixed selection of deliveries with longish trips. A case for the MAN TGL Hybrid, celebrating its world premiere in Hanover in 2008. It moves with parallel hybrid technology, promising greater efficiency especially in distribution transport with longish distances driven at a constant speed. The era of hybrid technology for distribution trucks began at MAN in 1983 already with the first diesel-electric powered G90, a 7.5-tonner resulting from MAN/VW cooperation. An L2000 prototype with plug-in technology appeared in 1996 that could be driven either on diesel across country or electrically in towns and cities. The batteries could be recharged from a power outlet, and the CO₂ footprint of the vehicle was very much reduced. MAN presented the first hybrid distribution truck with a crankshaft starter generator in 2001, and in 2006 came the TGL Hybrid with EDA, an electrodynamic moving-off element.

Weight- and space-saving lithium-ion battery

The new TGL Hybrid for distribution transport is an attractively sized 12-tonner. Working under the cab is a powerful four-cylinder EEV engine of 220 hp that delivers its output to a hybrid gearbox. Also integrated in the drive train is a 60 kW electromotor as a starter generator. A coupling separates the electromotor and gearbox from the combustion engine to allow electrically powered driving. The electric machine also serves as a generator, the braking energy being stored by a compact lithium-ion battery. The overall system consists of an automated six-speed gearbox, an electromotor and a high-voltage battery. It performs all functions of a full-hybrid system: stop/start, recovery of braking energy, support when

accelerating (boosting) and electrically powered driving. The intelligence of the system is seated in the hybrid energy management, controlling the energy flow between diesel engine, electromotor, energy storage, driving axle and auxiliary units. Energy management optimizes the torque split between diesel engine and electric machine. Operation of auxiliary units is ensured by power on demand.

The automatic stop/start saves fuel when idling, the electric pulling away by braking energy during acceleration that would otherwise be high on fuel consumption. A more powerful 6 kWh battery even enables purely electric powering over short distances. The extra electric power, all of 60 kW, allows downsizing of the combustion engine, the reduced power then being compensated in acceleration by the electromotor. The concept behind the TGL Hybrid cannot achieve the potential savings of the serial MAN Lion's City Hybrid municipal bus – MAN engineers currently reckon with up to 15 percent fuel savings. But the price of this is extra weight or reduced payload of less than 100 kilograms compared to a TGL for the same power with a six-cylinder engine. Taking driving performance and potential savings on the one hand and the current price of fuel on the other, this does not yet sum up into a business case for the customer.

Technical data

MAN Lion's City Hybrid

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|----------------------|---|--------------------------------|
| Diesel engine | Inline six-cylinder MAN D0836 LOH, lefthand vertical in rear (tower design), two-stage turbocharging and intercooling, common-rail direct injection, four-valve, low exhaust emissions by EEV with CRTec particulate filter | |
| | Capacity | 6.871 cm ³ |
| | Power rating | 191 kW (260 hp) at 2,300 rpm |
| | Max. torque | 1,050 Nm at 1,200 to 1,800 rpm |
| Generator | PSM sync with 150 kW output | |
| Drive motors | 2 asynchronous electromotors of 75 kW each, driving through summation gearbox to rear axle | |

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| Storage system | 12 air-cooled ultracap modules of 24 cells each, maximum charge/discharge 200 kW, energy content approx. 0.4 kWh |
| Inverter | PWM inverter in IGBT technology |
| Special auxiliary units | Electric power steering pump DC/DC onboard network converter Electric air conditioning compressor |

MAN TGL 12.220 Hybrid

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|---------------------------------|--|------------------------------|
| Diesel engine | Four-cylinder MAN D0834, two-stage turbocharging and intercooling, common-rail direct injection, four-valve, low exhaust emissions by EEV with MAN PM-KAT® | |
| | Capacity | 4,580 cm ³ |
| | Power rating | 162 kW (220 hp) at 2,400 rpm |
| | Max. torque | 850 Nm at 1,300 to 1,800 rpm |
| Electromotor / generator | Starter generator of 60 kW, torque 425 Nm | |
| Gearbox | Automated six-speed, TipMatic software adapted to hybrid use | |
| Electrical storage | Lithium-ion battery, capacity 2 kWh, option 6 kWh | |
| Inverter | PWM inverter in IGBT technology | |

Glossary

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| ABS | Antilock braking system |
| ACC | Adaptive cruise control |
| AdBlue® | Diluted urea solution as additive for SCR catalytic converters |
| AGR | Exhaust gas recirculation |
| APM | Air pressure management |
| ASR | Traction control |
| BTL Biomass to Liquid | Synthetic fuels of 2 nd generation obtained from biomass |
| CAN | Controller area network |
| CDC Continuous Damping Control | Continuous damping control for trucks |
| CDS Comfort Drive Suspension | Continuous damping control for buses |
| CNG | Compressed natural gas |
| CRTec® | Volume filter with closed, electronically monitored particulate filter |
| CTL Coal to Liquid | Synthetic fuel of 2 nd generation from coal |
| DSC | Dynamic stability program |
| DTCO | Digital tachograph |
| EBS | Electronic braking system consisting of electropneumatic brake, ABS and ASR |
| ECAS | Electronically controlled air suspension |
| EDC | Electronic diesel control |
| EEV Enhanced Environmentally Friendly Vehicle | Voluntary exhaust standard, tougher than Euro 5 |

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| EGR | Exhaust gas recirculation |
| EHLA | Electrohydraulic steering axle |
| ELT European Load Response Test | European load response test |
| EPA 2007 Environmental Protection Agency | Currently valid exhaust standard for the USA |
| ESC | European steady-state cycle |
| ESP | Electronic stability program consisting of dynamic stability program DSC and rollover protection ROP |
| ETC | European transient cycle |
| Euro 5 | Exhaust emission standard from October 2009 in Europe |
| EVB | Exhaust valve brake |
| EVBec | Exhaust valve brake, electronically controlled |
| FAME | Fatty acid methyl ester (generic term for biofuels) |
| FFR | Vehicle management computer |
| GTL Gas to Liquid | Synthetic fuel of 2 nd generation from natural gas |
| LCC | Life cycle costs |
| LED | Light-emitting diode |
| LGS | Lane guard system |
| LPG | Liquefied petrol gas |
| MAN BrakeMatic | Electronic brake control with speed regulation |
| MAN PM-KAT[®] | Patented surface diesel particulate filter from MAN |
| MAN TipMatic[®] | Automated gear shift from MAN |
| MSC | Maximum speed control for buses |
| NO_x | Overall term for nitrogen oxides NO and NO ₂ |

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|----------------|---|
| OBD | Onboard diagnostics |
| OBU | Onboard unit for toll collection |
| Oxi-Kat | Oxidation catalytic converter to reduce nitrogen oxides |
| PSM | Permanent sync motor (electromotor) |
| PTO | Power takeoff |
| RME | Rape seed oil fat acid methyl ester - bio diesel of 1 st generation from rape seed oil |
| ROP | Electronic rollover protection |
| SCR | Selective catalytic reduction for nitrogen oxides, works with AdBlue [®] additive |
| TCO | Total cost of ownership - purchase, operation and maintenance |
| TPM | Electronic tyre pressure monitoring system |

MAN Nutzfahrzeuge Group corporate portrait

MAN Nutzfahrzeuge Group, based in Munich, Germany, is the biggest company of the MAN Group, and a top-ranking international supplier of commercial vehicles and transport solutions. In fiscal 2007 the company, with over 36,000 employees, posted sales of more than 93,000 trucks and over 7,300 buses and bus chassis of the MAN and NEOPLAN brands worth 10.4 billion euros. The operating result rose by 49 percent compared to one year earlier to a record more than 1 billion euros (including the result from financing).

The share of the European market for trucks of more than 6 tonnes is 16.1 percent. The share of the European market held by the two bus brands in fiscal 2007 was 14.3 percent.

In 2008 the MAN Group is celebrating its 250th jubilee. 2008 also marks the 150th birthday of Rudolf Diesel. At the Maschinenfabrik Augsburg, later to become MAN, Diesel in 1893 started to design the engine that was eventually named after him.

Five sites in Germany

MAN Nutzfahrzeuge manufactures trucks in weight categories from 7.5 to 44 tonnes, heavy-duty special-purpose vehicles of up to 250 tonnes gross vehicle weight, municipal and intercity buses and tourist coaches (complete as well as chassis) plus diesel and natural gas engines. In Germany the company operates five manufacturing sites: Munich, Nuremberg, Salzgitter, Pilsting and Plauen.

Added to this there are manufacturing locations in Vienna and Steyr (Austria), in Poznan, Starachowice and Krakow (Poland). Further afield there are production sites in Ankara (Turkey), in Olifantsfontein and Pinetown (South Africa), and in Querétaro (Mexico).

As part of a joint venture with Force Motors Ltd. in India, heavy trucks have been produced since October 2006 for the Indian market, and since 4Q/2007 for export too.

MAN Nutzfahrzeuge is pursuing an international growth strategy, aimed beyond the key European market at developing emerging markets in Asia and Eastern Europe together with Russia.

Broad-based selection of trucks

MAN trucks range from the TGL (7.5 to 12 tonnes) through the middleweight series TGM of the Trucknology® generation (12 to 26 tonnes) to the TGS and TGX series, allowing gross vehicle weight between 18 and 44 tonnes. On Poland's market the STAR brand is offered in addition to trucks from MAN.

In 2007 the proven heavyweight TGA series was continued in the two new series TGS and TGX, subsequently voted "Truck of the Year 2008". MAN is the first manufacturer to win this coveted award seven times. Two years earlier the TGL from MAN was "Truck of the Year 2006".

In India the MAN FORCE TRUCKS joint venture produces the CLA series for markets in Asia and Africa. Their gross vehicle weight ranges from 15 through 26 tonnes.

TGA WW is a series of robust trucks, of 19 through 41 tonnes gross vehicle weight, aimed at growth markets in Russia, Asia and Africa. These come from the new plant in Polish Krakow.

Buses from MAN and NEOPLAN

The Bus Division of MAN Nutzfahrzeuge Group designs, produces and markets buses of the MAN and NEOPLAN brands. The product range comprises tourist coaches, intercity buses, city buses plus chassis. These are manufactured primarily at the two Polish sites Starachowice and

Poznan, in Ankara in Turkey and at the German plants Plauen and Pilsting. The competence center for chassis is located in Salzgitter.

The Bus Division is also leading in its sector. The NEOPLAN Starliner has won various design prizes plus the "Coach of the Year" award in 2006. This was the third time in a row that the award went to a bus from MAN or NEOPLAN. In 2008 the MAN Lion's Regio was chosen the best intercity bus of the year, for the fourth time, in a reader poll by publisher ETM in Germany.

MAN Engines Division

In addition to engines for MAN commercial vehicles as well as MAN and NEOPLAN buses, MAN Nutzfahrzeuge develops and produces engines for a variety of industrial purposes: from industrial engines for electricity generation through to means of propulsion for rail, water and special-purpose vehicles.

The power spectrum ranges from 100 to 1,550 hp. In addition, the company is a system supplier to other vehicle manufacturers, and offers drive units for various kinds of road vehicle. More than 110,000 units were produced in 2007. In 2006 the MAN PM-KAT® was awarded the Environment Prize of the German Federation of Industries (BDI) in the category "environment-friendly products".

MAN is working intensively on the implementation of engine technologies aimed at a sustained reduction of fuel consumption and emissions. A continual increase in efficiency underscores the impressive competence of MAN when it comes to diesel engines. Additionally there is increased focus on technologies for the future such as hybrid drives in city buses and distribution transport.

Extensive portfolio of services

In MAN|Service, MAN|Support and MAN|Finance, MAN Nutzfahrzeuge offers the customer internationally ranging services all from a single source. Whether a service and repair contract, fleet management or a financing solution: MAN combines top-notch technology with services tailored to the user's requirements.

MAN and NEOPLAN customers have access European-wide to some 1,200 authorized centers for service, vehicle maintenance and repair.

In the event of a breakdown MAN|Service Mobile24 guarantees reliable assistance 365 by 24.

Manufacturing sites

Germany

- Munich: Centre for trucks and buses, heavyweight trucks, spare parts
- Nuremberg: engines
- Salzgitter: heavyweight trucks, competence center for bus chassis
- Plauen and Pilsting: premium-class tourist coaches, municipal and tourist double-deckers

International

- Vienna, Austria: special-purpose vehicles
- Steyr, Austria: lightweight and middleweight trucks, spare parts
- Krakow, Poznan and Starachowice, Poland: heavyweight trucks, low-floor city buses, components
- Ankara, Turkey: standard tourist coaches, intercity and municipal buses
- Olifantsfontein and Pinetown, South Africa: bus and truck assembly
- Pune, India: heavyweight trucks joint venture
- Querétaro, Mexico: bus and truck assembly