



# URBAN TRANSPORT

INTRODUCING A NEW BUS GENERATION



**SCANIA**



# ACHIEVING SUSTAINABLE MOBILITY

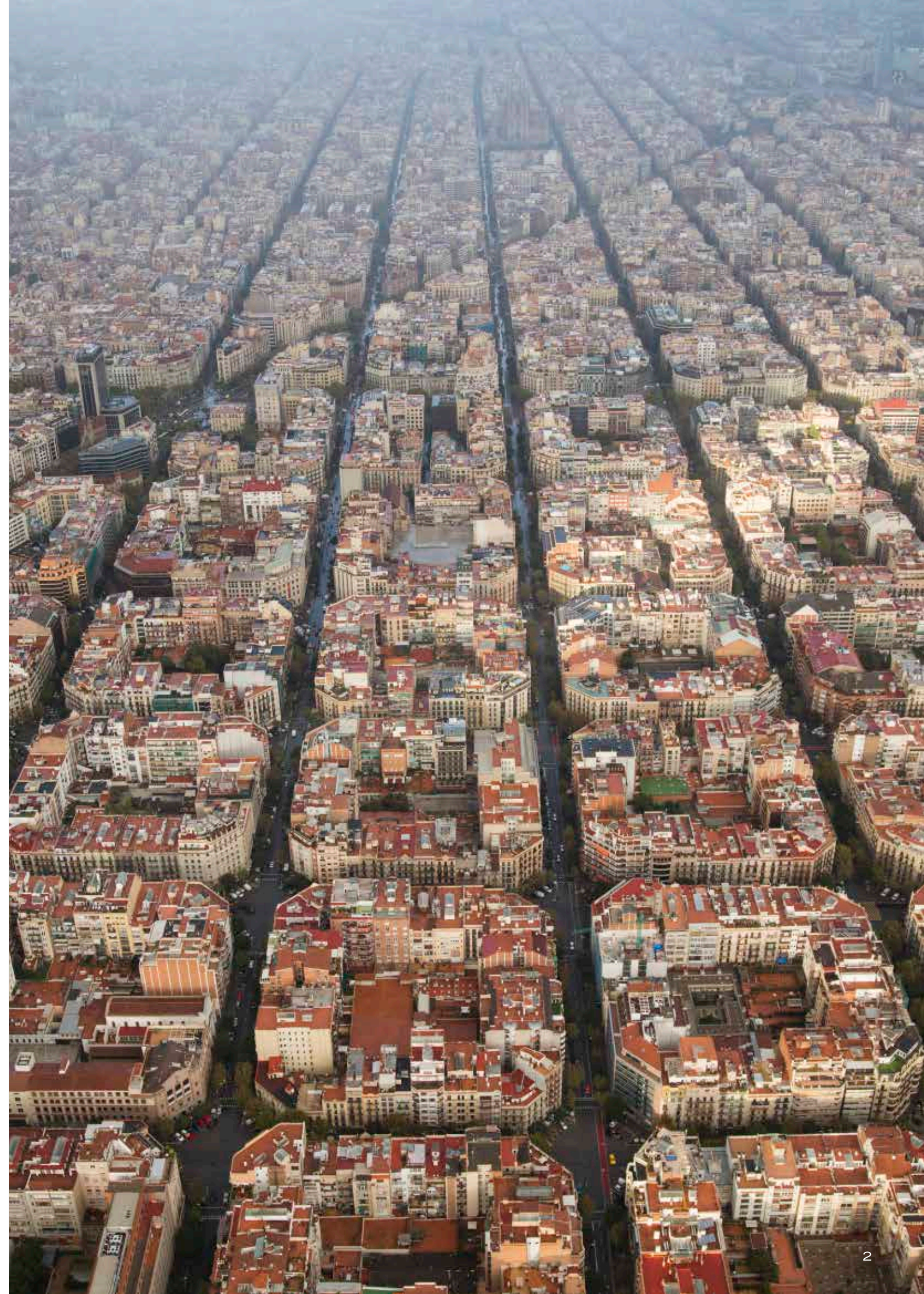
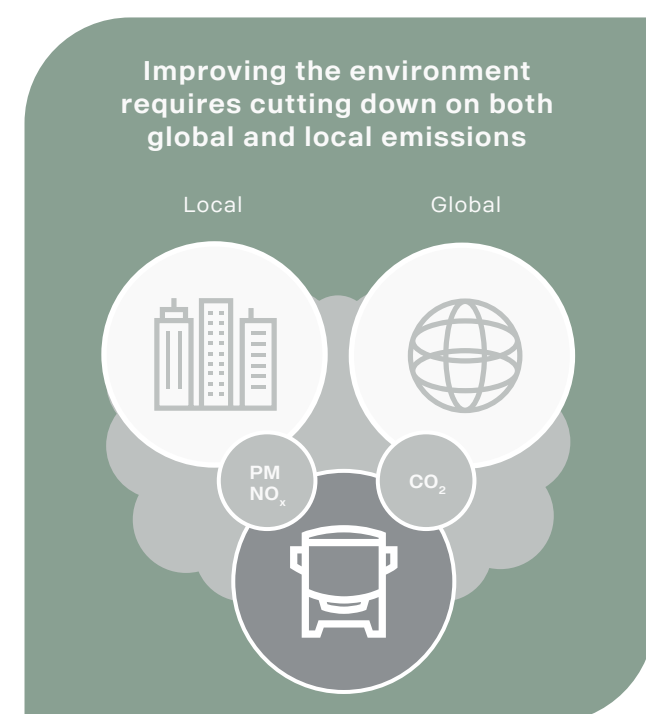
Metropolitan areas all over the world are affected by the rise in transport needs that comes with urbanisation. This presents challenges in terms of congestion as well as emissions and pollution that affect both people and the environment.

Much can be gained by reducing the number of vehicles and instead getting people to commute together. But to make that happen, the public transport system needs to be an attractive alternative for potential passengers, and to further reduce emissions, the system also has to consist of energy-efficient vehicles running on electricity or renewable fuels. Simply put, switching to low-carbon vehicles will be crucial to create a transport system that stays within the environmental boundaries of this planet.

Scania wants to be a frontrunner in this shift to sustainable transport. And we know that caring about the bigger picture means putting a lot of effort into the details. Over more than a century, we have accumu-

lated a deep understanding and a knowledge base that allows us to develop buses and services that make sustainability go hand in hand with operating economy - which is needed to make sustainable transport happen on a wide scale.

Further, it cannot be achieved through a single solution. We at Scania instead approach the challenge from all angles, offering a wide range of efficient quality products and services to meet the varying needs in urban environments.





# ELECTRIFIED AND RENEWABLY FUELLED BUSES

Bus traffic in and around cities is highly complex, combining many different needs. In inner cities, buses travel at relatively low speeds with frequent stops, and passengers often commute short distances. When it comes to suburbs and outer areas, the vehicles often travel at higher speeds with fewer stops, largely carrying passengers who travel longer distances.

### Taking a regional view

When aiming to decarbonise a bus fleet, it is therefore crucial to have a regional view. Notably, most buses in metropolitan areas are not found in the inner city. Instead, suburban and regional traffic often account for a larger number of buses and a much larger part of fuel usage and emissions.

Minimising emissions in the different parts of a metropolitan area is largely about analysing how this should best be done and what technology is most suitable today. In some operations – most notably in inner city traffic – fully electric buses represent the best choice for reducing emissions, assuming the electricity used is renewable. In other areas, such as in

regional traffic, fully electric is often not yet the most suitable solution. Instead, the biggest reductions can be reached with conventional or hybrid electric buses running on renewable fuels.

Scania's complete offering of fully electric, hybrid electric and renewably fuelled powertrains enables minimised environmental impact in all parts of a region - utilising the technology most suitable for the local conditions.



These percentages show common distribution of vehicles and CO<sub>2</sub> emissions in a public transport bus fleet serving a metropolitan area of more than a million inhabitants.

Inner city	Biodiesel/FAME	HVO	Biogas	Hybrid electric	Fully electric
Suburb	Biodiesel/FAME	HVO	Biogas	Hybrid electric	Fully electric
Region	Biodiesel/FAME	HVO	Biogas	Hybrid electric	

A wide portfolio of low-carbon vehicles.

### Implementing an electric bus system

Compared to a bus system using only conventional powertrains, a system with fully electric buses needs to be optimised in a wider sense.

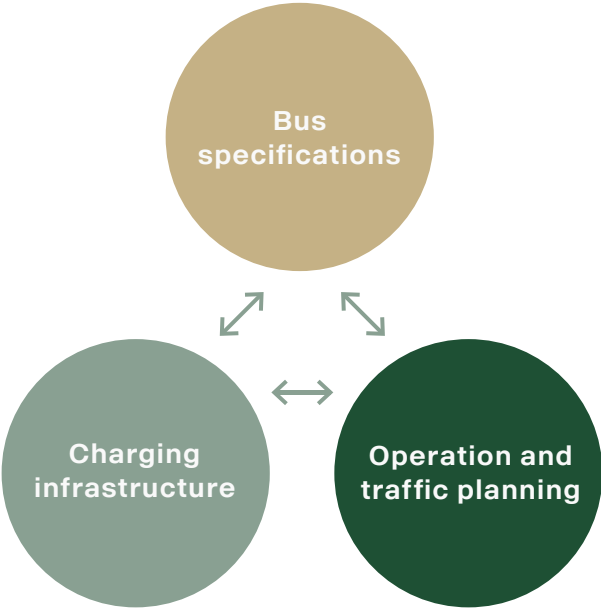
The choice of vehicles needs to be thoroughly considered with regard to battery configuration and service life, operating range, energy consumption and performance, as well as passenger capacity. Careful traffic planning and management is also required, based on operational demands and harmonising with the charging infrastructure.

#### Opportunity charging

The bus is charged at the depot and heads out to the route, where it gets regular quick recharges at one or more strategic stops. The bus can operate on the route for as long as needed.

#### Depot charging

The bus is fully charged at the depot and drives to the route, where it operates until the battery runs low. It then turns back to the depot for a longer charging session before going back into operation.



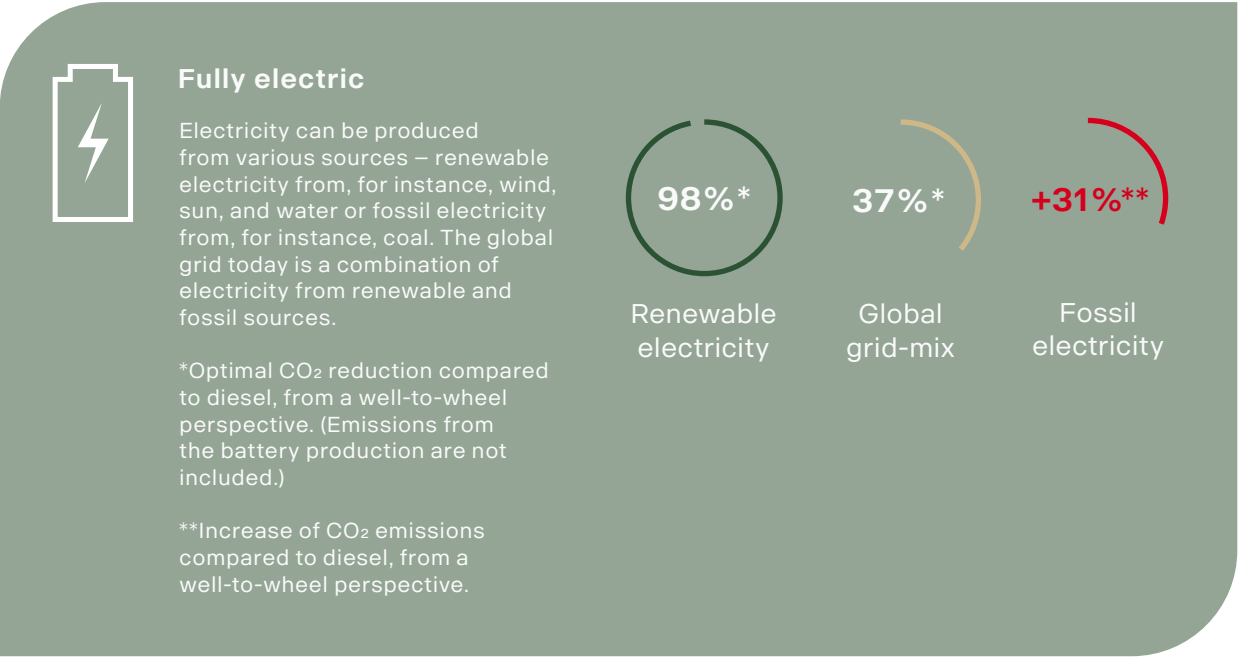
Factors to consider for a bus system with fully electric buses.



Fully electric powertrains

Scania’s fully electric buses help achieve the sustainable mobility needed in modern cities today and in the future. Offering minimal noise and zero tailpipe emission, they have successfully operated in demanding climates since early 2018. The buses are optimised for fast in-route charging and therefore have a limited need for energy storage, with a battery weight distribution that results in

a well-balanced vehicle. The fact that fewer batteries are required means environmental impact is kept to a minimum. It also allows for higher passenger capacity and uptime, making these buses ideal for high-intensity traffic. To meet different operational needs, the charging done in-route can of course be combined with depot charging.



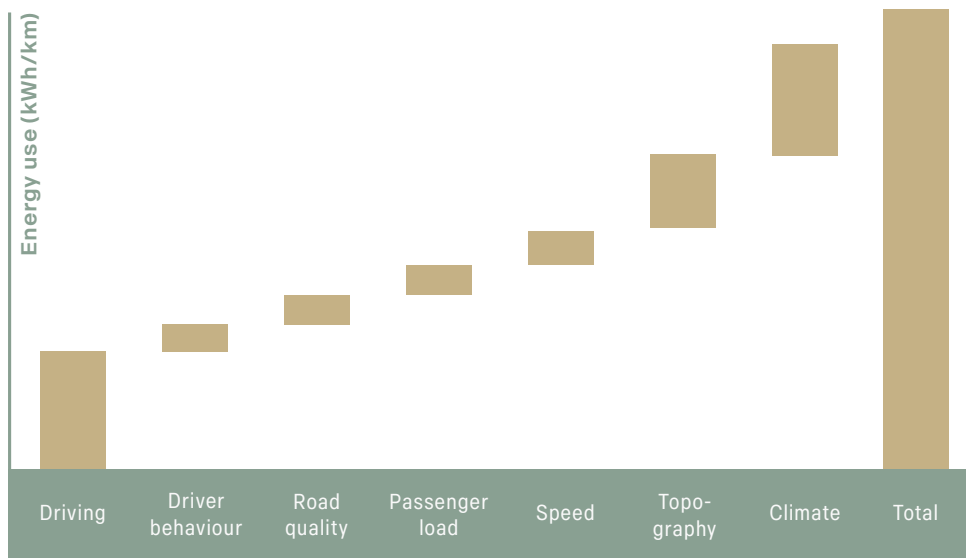




# ENERGY-EFFICIENCY THAT MAKES A DIFFERENCE

The energy consumption of a bus depends on several parameters. To achieve the most energy-efficient operations, it is necessary to consider the impact of both product technology and product usage, as well as passenger load and surrounding factors.

The chart on the right shows how different factors affect energy consumption, in this case for a fully electric bus. For these buses, the energy consumption – both from propulsion and auxiliary power – can have a significant impact on the operational range. It is therefore important to design the system with consideration to the technical solution and battery capacity.



Factors affecting performance.

Source UITP/ACEA

For combustion-driven buses, many of the factors remain the same, although climate has less of an affect and maintenance becomes an important factor. All in all, it is by considering all these factors that fuel consumption can be lowered, which in turn then reduces emissions.

**Addressing consumption from all angles**  
Scania addresses the fuel consumption issue from all angles making sure operators have the right vehicle for the operation and that it is used in an optimal way.

With high-quality buses, innovative technical solutions that support the driver, as well as through high-quality maintenance and driver services, we help cities and operators minimise the environmental impact.

Initially, it is crucial to make sure the bus is specified to perform in a way that reduces energy consumption, but without compromising on factors such as performance and passenger capacity. This process covers choice of powertrain components, support systems, possible use of alternative fuels and more.

During operation, the vehicle must be kept in optimal condition through high-quality maintenance, which can include axle alignment as well as regular maintenance such as checking tyre pressure and status and oil and filter changes.

As described, driving style also plays an important part in the vehicle’s energy consumption. Scania’s driver services, consisting of both training and coaching

of drivers, can have an immediate impact and typically reduces fuel consumption and emissions by as much as 10%.

**Science-based targets**

As the first major manufacturer of heavy commercial vehicles, Scania's far-reaching climate targets have officially been approved by the Science Based Target initiative (SBTi). Scania is committed to achieving the Paris agreement goals of limiting global warming to 1.5°C above pre-industrial levels. Scania will cut CO<sub>2</sub> emissions from its own operations by 50% by 2025 and reduce emissions from its products by 20% during the same period.



# SAFE AND APPEALING BUSES

## Safety first – inside and around the bus

Safety is of utmost importance in urban environments, in which the conditions are often stressful for bus drivers. Therefore, vehicle design as well as digitalised and automated services play a crucial role in limiting risks and protecting drivers, passengers, pedestrians, cyclists, and other road users.

### Accident prevention

To prevent accidents and create a safer city environment, Scania buses have built-in state-of-the-art safety systems and features. These systems help the driver by increasing his or her awareness of surrounding road users or even helping to control the vehicle when needed. Our advanced driver assistance systems (ADAS) include vulnerable road user collision warning, blind spot warning, adaptive cruise control, attention support, and advanced emergency brake. Some of these systems are already legal requirements in certain countries, but all of them are available in Scania buses today.

Additionally, electro-pneumatic parking brake technology prevents unintentional bus motion and thus potential accidents, as it locks the brake until acceleration is activated. Driving can then be further assisted through Scania Zone, a service which, among other things, helps the driver comply with speed regulations and speed limits, for instance around schools or in bus depots.

### Minimising potential damage

Although accident prevention is of course to be preferred, accidents can happen. Therefore, the vehicle itself, right down to its individual components, needs to be designed in a way that protects the driver, passengers and all involved counterparties. Scania buses help avoid major deformations and prevent, for example, passenger cars from sliding under the bus. Through reinforced body and chassis construction at the front and rear, our buses are built to be as safe as possible. For everyone.

## Buses to increase public transport appeal

To encourage more people to use it, the public transport system must be accessible, user friendly and time-efficient. Another crucial aspect is that journeys should be comfortable and relaxing, and in this, the vehicle itself plays an important role.

### A pleasant ride

Scania buses offer independent front suspension that is very forgiving, making the ride more comfortable. Our advanced suspension technology also allows the aisle to be made wider without compromising on passenger capacity. The wider aisle can also help improve accessibility. This has an impact on how passengers perceive the journey, not least passengers who are physically impaired. Additionally, the buses' excellent drivability, combined with Scania's driver services, can help to substantially improve passenger comfort.

Having fresh air and the right temperature inside the bus is also crucial to the passenger experience. Scania's highly efficient climate system minimises energy consumption, regardless of climate. This, along with the fact that this cooling system is separate from that of the powertrain, results in a comfortable environment with good air flow at all times. In addition, low noise levels make for more relaxing journeys, and with not least fully electric powertrain options, Scania offers the possibility of almost silent buses.

### Designed for the cityscape

Further, the design and quality materials of the Scania Citywide help minimise noise inside the bus and generate a bright and spacious interior, creating an attractive and welcoming environment. To further increase the appeal of public transport, the bus also has a contemporary minimalist exterior design.



# IMPROVING OPERATING ECONOMY

Operators in urban environments know the importance of keeping costs to a minimum. At Scania, customer profitability constitutes a foundation for the products and services we develop - always with the human perspective in mind.

Our buses are highly energy-efficient and reliable, which, along with the professional supporting services we offer, benefits operating economy. And because they boast high passenger capacity figures, they can potentially also keep costs down by lowering fleet investments.

Moreover, keeping drivers safe, healthy and alert is another aspect of operational importance and the top-quality driver area in Scania buses can make a big difference.





# ENERGY EFFICIENCY THAT LOWERS COST

As mentioned, a vehicle's energy consumption depends on a number of factors. Powertrain performance and vehicle construction are two important parameters, as is specifying the vehicle according to operating conditions such as topography and climate. Moreover, how the product is used in operation will also have a major impact on energy consumption.

## Powertrain performance

Because fuel consumption is one of the main factors in operating cost, an efficient powertrain can save a lot of money. Scania develops and offers highly energy-efficient powertrains, both conventional and electrified. Compared to the previous generation, the new generation of Scania buses can reduce fuel consumption and emissions by as much as 21%, and without compromising on performance. This is achieved through a number of factors, with the most significant savings coming from improved engine and gearbox efficiency, altered engine position, weight reductions and the addition of a start/stop function.

The engine alone can save up to 6%, depending on engine size and vehicle use. Additionally, the gearbox can contribute savings of up to 3%, while weight reductions can account for a further 3%. Most of this regards reductions in chassis weight, but the body of the Scania Citywide is also lighter, and because customers can tailor the vehicle length, unnecessary weight can be eliminated. Furthermore, because the position of the engine has been altered to a longitudinal position on low-floor buses,

fuel consumption can be reduced by up to 3%. Finally, the addition of a start/stop function can take a massive 6% off consumption in diesel driven buses, with this figure increasing to 15% for gas-driven buses.

During operation, energy efficiency also depends on the actual performance of the powertrain, and regular, high-quality maintenance is key to keeping performance optimal.



## Optimising vehicle usage

Besides the powertrain, driving style also has a major impact on fuel consumption. The drivability of Scania vehicles and our driver assistance systems and driver services can help operators achieve large savings. Operation-based, hands-on driver training, driver support via the instrument panel, and adjustments through driver coaching typically contributes to fuel and emissions savings of 10%. In addition, Scania's fleet management services allow operators to view and collect real-time fuel consumption data and make operational adjustments or schedule trainings to improve.





# ENSURING AVAILABILITY

We know the cost of downtime, and that increased vehicle utilisation is key to achieving cost-efficient operations. To make this possible, the vehicle first and foremost needs to be well designed and reliable with good drivability. Keeping the vehicle in peak condition then also requires workshop services that are both professional and relevant. All in all, this reduces both downtime and operational costs.

## Buses designed for uptime

Scania produces around 100,000 vehicles each year, and our buses are built on proven technology and components. This results in chassis and powertrains that are dependable, durable, and robust – meeting a wide variety of demands in terms of topography, climate conditions, driving styles and road conditions.

The vehicle's design and construction must also ensure that sensitive and expensive components are protected in the event of a collision. Limiting damage and avoiding deformation of components such as steering system, aftertreatment system or batteries is critical in order to minimise costs and complex, time-consuming repairs. In short, having reliable vehicles is of essence to minimise time in the workshop and maximise operational usage.

### Reduced charging time

For fully electric buses, charging time is critical in determining uptime. With both in-route and depot charging capability, the fully electric Scania buses have the flexibility to meet different operational needs. Leaving the depot fully charged, the bus can handle morning peak hours without having to recharge and can then continue operating for the remainder of the day by charging in-route.

Additionally, Scania buses are designed to make maintenance as easy and efficient as possible. Easy access to regularly changed parts and good cleanability ensures that the vehicle does not spend more time in the depot than necessary.

We build our vehicles with all this in mind, but also to prevent and avoid accidents altogether, which is of course to be preferred. Therefore, Scania buses offer great drivability and state-of-the-art driver assistance systems.



## Workshop services to rely on

Keeping the vehicles in top condition is crucial in all public transport systems. Through a worldwide service network, Scania can provide expert repair and maintenance services, supported by outstanding spare parts availability.

Scania offers services specific to the needs of each individual vehicle, making sure they are neither underserved nor overserved. This ensures high availability throughout the fleet and

eliminates unnecessary costs. Based on real-time vehicle data, we can draw up tailored maintenance plans that maximise uptime and minimise disruption in the daily operations. Connectivity and real-time data also allows proactivity, either completely preventing a breakdown through vehicle data analysis and operational data, or preparing the workshop and spare parts by initially diagnosing the vehicle remotely. Furthermore, having access to this data allows the

workshop time to be used as efficiently as possible. By combining and concentrating repair and maintenance to the same occasion, total downtime can be reduced. All this can be performed in a Scania workshop or by the operator, with Scania supplying the support needed. In addition, we offer workshop quality assurance and staff training as well as back-up services for time-consuming and complex repairs.

### Reduced maintenance need

Prolonged service intervals reduces maintenance need and increases uptime. As an example, our new 7-litre engine has doubled its service intervals from 22 500 km to 45 000 km.





## EXCELLENT PASSENGER CAPACITY

In traffic planning, travel patterns and the number of passengers travelling in the system are two of many important factors that need to be taken into account. If possible, reducing the fleet by even a single bus can have a big impact on operating cost, for example by lowering fuel and maintenance costs and the need for additional drivers.

Therefore, buses with high passenger capacity figures can potentially

keep these costs down for operators, while also improving passenger flow in the public transport system. And by limiting the need to operate extra buses during peak hours, high capacity buses can also bring down fleet investment spend.

With one of the best passenger capacity figures available, Scania buses allow operators to reap these benefits. High axle load capacity, reduced chassis and

body weight, and new interior layout options means vehicle weight can be kept down, allowing for more passengers. This is further underlined in our fully electric variants, where in-route charging capacity minimises the needed battery weight.

## A FIRST-CLASS DRIVER AREA

A bus operating in urban traffic is constantly exposed to the risk of external damage, and the work environment for drivers can be very demanding. We have therefore developed a driver area that we believe is industry-leading. A great turning radius, excellent visibility, and an overall well-balanced vehicle makes for excellent drivability, while advanced driver assistance systems gives the driver good control of the vehicle through improved assisted

handling, steering and braking. This increases safety and helps minimise accidents, thereby avoiding unnecessary costs.

Due to the demanding work environment, operators also face challenges when it comes to high sick leave and employee retention. In addressing this issue, the driver area is an important factor and Scania has designed the best possible work environment for drivers in terms of ergonomics

and reachability, climate control, safety features as well as the overall quality feel. All in all, this benefits both the drivers and operators.



# SOLUTIONS

Scania wants to help cities and operators achieve sustainable mobility, and we believe the way to do that is through complete solutions consisting of both products and services.

Our flexible product portfolio consists of a wide range of products with multiple options, allowing for customised configurations that enable operators to meet various needs in urban operations.

The services we offer can be of equal importance. Our service offering consists of a number of services for minimising emissions and optimising operating economy, focusing on areas like fuel economy and uptime.

This complete package enables us to offer suitable solutions catered to each operator’s individual challenges and needs.



# PRODUCT OFFERING

Scania Citywide – low floor



Scania Citywide – low entry



Scania Interlink – high floor



C-chassis – low floor



K-chassis – low entry



K-chassis – high floor



Fully electric	Power	Torque	Batteries
Electric motor	300 kW peak 250 kW continuous (R85)	5400 Nm (peak) 3400 Nm (continuous)	8 or 10 battery packs Capacity: ~250 kWh or 320 kWh
Hybrid electric (Euro 6)	Power	Torque	Fuel
9-litre Electric motor	320 hp (235 kW) 130 kW	1600 Nm 1030 Nm	Biodiesel, HVO, diesel
Combustion (Euro 6)	Power	Torque	Fuel
7-litre	280 hp (206 kW)	1200 Nm	Biodiesel, HVO, diesel
9-litre	280 hp (206 kW) 320 hp (235 kW) 360 hp (265 kW)	1400 Nm 1600 Nm 1700 Nm	HVO, diesel Biodiesel, HVO, diesel Biodiesel, HVO, diesel
9-litre	280 hp (206 kW) 340 hp (250 kW)	1350 Nm 1600 Nm	Biogas, natural gas Biogas, natural gas
13-litre	370 hp (272 kW) 410 hp (302 kW)	1900 Nm 2150 Nm	HVO, diesel Biodiesel, HVO, diesel



# SERVICE OFFERING

## Driver services

Enables drivers to drive safer and more efficient, and can reduce the need for maintenance.

### Scania Driver Training

Combines theory and practice, covering topics such as safe and efficient driving, especially important when it comes to electrical vehicles, not only to save energy but even regenerate energy by optimal driving. Handles also other aspects of professional driving, always with a focus on profitability, fuel economy and reduced emissions.

### Scania Driver Evaluation

An on-board device that assesses the driving style by comparing it to that of drivers operating in similar conditions. The result, which can be used to achieve long term improvements, is visible in the Scania Fleet Management Portal and Scania Fleet App.

## Tachograph services

The fleet is monitored via the tachograph portal, facilitating compliance with EU regulations regarding driving and working time. A tool that provides in-depth insights into driver activities and vehicle use, thus helping operators maximise uptime, comply with laws and regulations and meet health and safety requirements for drivers.

## Fleet management system

The data collected on board the buses provides valuable insight into driving styles, productivity and economy. This level of tracking and diagnostics can bring significant benefits in terms of increased uptime, improved safety and reduced operating costs. Through the Scania Fleet Management Portal and the Scania Fleet App, operators can gain access to valuable insights and reap the benefits.

### Scania Zone

A position-based system for real-time vehicle adjustments in predefined zones. It allows operators to ensure that each vehicle stays within the set speed limits, increasing city safety and lowering fuel consumption. Scania Zone is an optional add-on in Scania's fleet management system.

## Repair and maintenance services

Having access to professional workshops and quality spare parts is key to keeping the vehicles in prime condition. Scania offers a range of repair and maintenance services.

### Scania Flexible Maintenance

Uses real-time vehicle data to produce maintenance plans tailored to each vehicle's actual operation. This is done by continually monitoring and analysing operational data to ensure maximum uptime and schedule maintenance customised to the operations, thus increasing productivity and decreasing disruptions.

### Scania Fleet Care

The fleet operator receives a dedicated Fleet Manager from Scania equipped with advanced tools and systems, to optimise maintenance and prevent breakdowns based on operational data and vehicle data analysis.

### Customer workshop services

A tailored collaboration service designed to facilitate for the operator by streamlining and quality assuring the workshop and workshop processes to meet Scania standards.





