



SCANIA ENGINE PERFORMANCE AND ECONOMY

Technologies for Euro 4 and Euro 5.





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Scania Euro 4 with EGR:

- Possibility to benefit from expected tax and road fee incentives all over Europe
- No additives or extra tanks needed – just fill up standard diesel
- Thoroughly tried-and-proven technology that reduces emissions in all conditions
- Euro 4 emissions with Euro 3 fuel economy

EURO4

Euro 4 from Scania – just fill up and GO!

From September 2004, Scania's fuel-efficient 420 hp Euro 4 truck engine enables operators all over Europe to benefit from expected road fee and tax incentives.

And it's all very convenient. With this engine, no additional substances are needed – and no extra tanks that take up space and weight. Just fill up with standard diesel – and GO.

Scania's EGR technology reduces emissions in all conditions. What's more, operating costs and road performance are unchanged from Euro 3! So you will get typical Scania driveability and operating economy.

By autumn 2005, Scania will be adding a full range of Euro 4 engines for all types of applications, trucks as well as buses, and from 2006 a couple of Euro 5 engines for even lower emission levels.

Your platform for efficiency and profitability.

Over the years, Scania has consistently managed to achieve excellent operating economy with ever lower exhaust emissions. Fuel consumption, performance and driveability have been maintained or even improved when progressing from Euro 1 to Euro 2 to Euro 3.

And the same applies in the next big step to Euro 4. This is good news concerning operating costs and driver appeal. Scania's high standards in these areas will not be compromised.

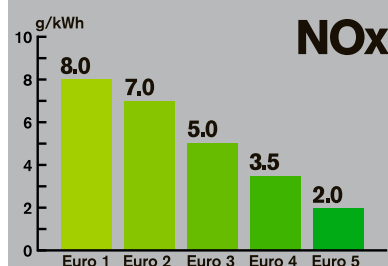
Taking the right approach.

Scania has always strived to control emissions at source, inside the combustion chamber. The cleaner the combustion, the better – because there is less to clean up afterwards.

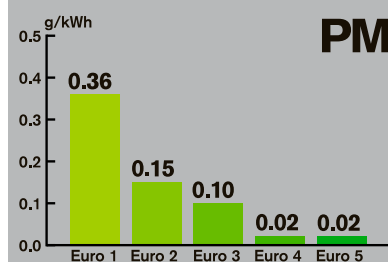
Developing combustion technology is largely about finding a reasonable balance between fuel consumption and the formation of nitrogen oxides. This requires combustion to be precisely controlled at relatively low temperatures.

However, somewhat further into the future or in certain circumstances it becomes reasonable to complement the refined combustion process with an aftertreatment system such as SCR, oxidising catalysts or particulate filters.

SUBSTANCES IN FOCUS.



Nitrogen oxides (NOx) – either NO or NO₂ – form during combustion when oxygen (O₂) reacts at high temperature with nitrogen (N₂) in the air. If we lower NOx, specific fuel consumption goes up. However, important developments by Scania in engine technology have achieved lower emissions without adversely affecting fuel economy.



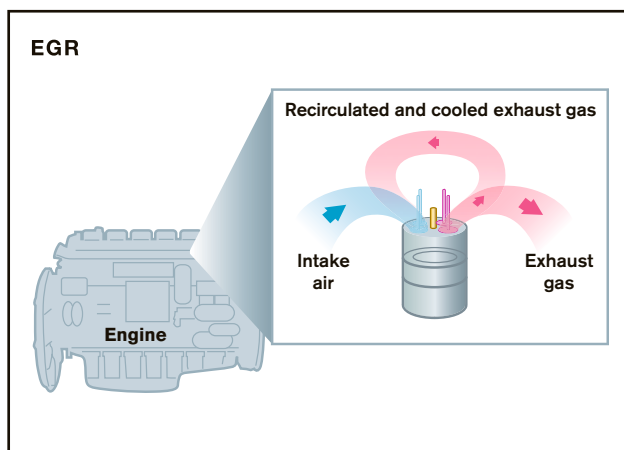
Particulate matter (PM) in the exhaust gases consists of fine particles of carbon (soot) and hydrocarbons that are formed in low-oxygen parts of the combustion flame. Sulphur in low-quality fuel also increases the particle content.

Mastering Euro 4.

Consistent development of combustion technology enables Scania to provide Euro 4 engines with Euro 3 levels of operating economy. A higher resale value may also be an important factor.

The Euro 4 legislation enters into force in October 2005 for new engines and one year later for existing engines.

For Euro 4, Scania has adopted two different technologies to further reduce emissions from diesel engines. Depending on customer demands, national conditions, road fee and tax incentives, Scania can thus supply the technology that is most appropriate for each application.



EGR (Exhaust Gas Recirculation).

With EGR, Scania attacks emissions at source – in the combustion chamber. No substances need to be added.

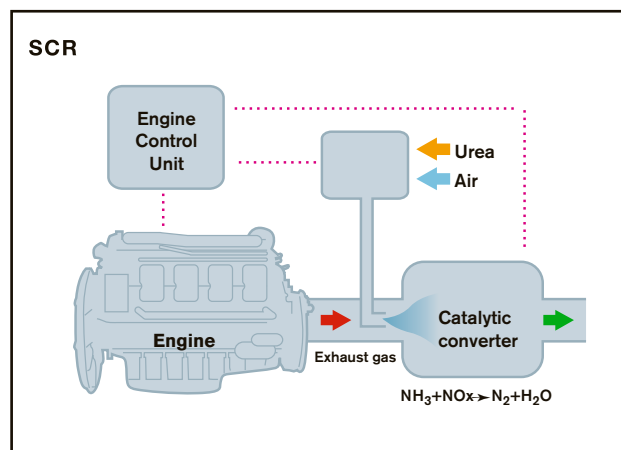
Scania has chosen this technology to ensure that these Scania Euro 4 vehicles can operate on standard diesel fuel available at any pump, without any worries about the availability of additives.

The engines feature Scania's own engine management system as well as Scania's high-pressure fuel injection system (Scania HPI) to achieve optimum economy. In some cases turbocompounding will be used.

Scania EGR combines lower emissions with excellent operating economy. EGR is a tried-and-proven solution that has been used on passenger cars and on heavy trucks in the US for many years. Some of the exhaust gases are cooled and fed back into the engine to achieve a lower combustion temperature. (A lower combustion temperature gives lower nitrogen oxide emissions and high injection pressures give lower particulates.)

Scania's EGR technology effectively reduces emissions in all conditions, including highway driving and long-haulage, as well as low speed stop-and-go as in urban areas. This makes EGR an excellent solution e.g. for city buses and urban distribution trucks. Scania's EGR system also saves weight, reduces complexity and leaves space for larger fuel tanks.

Operating costs are similar to Scania's Euro 3 engines – and this is achieved despite considerably lower emissions, both of nitrogen oxides and particulate matter.



SCR (Selective Catalytic Reduction).

To ensure adequate cooling reserves on the most powerful V8 engines, Scania will use SCR (selective catalytic reduction) to achieve Euro 4. These vehicles can operate in areas where the infrastructure for AdBlue has been extended, or carry extra supplies on-board.

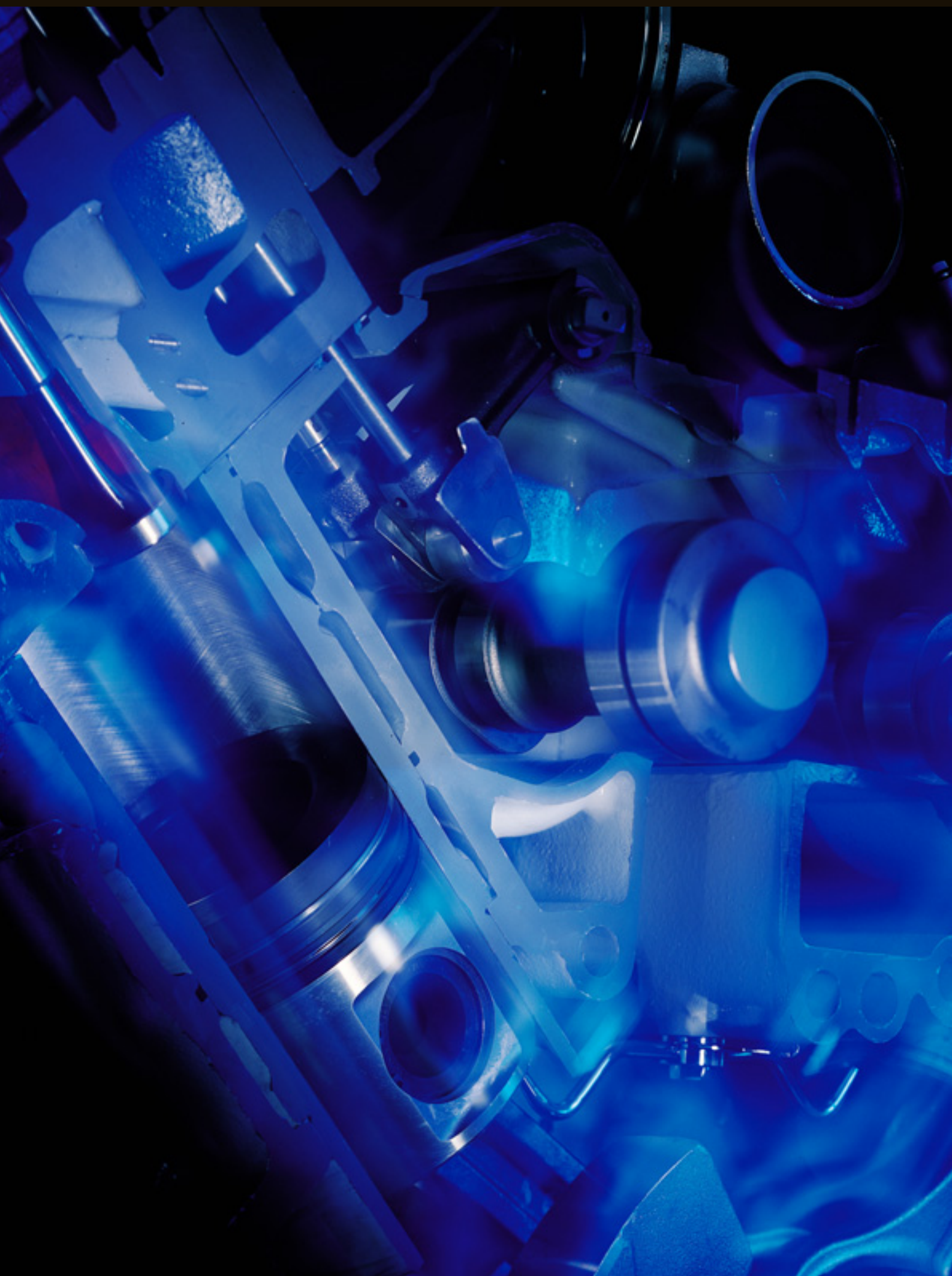
SCR is an aftertreatment method that requires a urea-based additive, AdBlue, to reduce emissions. AdBlue may also need to be filled when the vehicle is refuelled. An additional tank is required for AdBlue.

AdBlue is injected in the exhaust to maintain a reaction in the catalytic converter, which is integrated in the silencer. This aftertreatment method is used to reduce NOx.

By the time Scania introduces SCR on the most powerful engines in late 2005, the infrastructure for the urea-based additive, AdBlue, will be more developed in western Europe. Scania has also developed a patented monitoring system to ensure that the SCR-system is operating at all times.

SCR is efficient at highway speed, high engine load and high gross weight. A small advantage in fuel consumption must be balanced against the cost and availability of AdBlue.

Overall operating cost, including AdBlue, will be similar to comparable Scania Euro 3 engines.





Bright future for the diesel engine.

Measured against all known alternatives, the compression-ignition principle used in diesel engines offers excellent efficiency.

This fundamental advantage is not restricted to the diesel fuel we use today. If mixed with biofuels in carefully controlled proportions, it retains its superior combustion properties and overall efficiency. Synthetic diesel produced from natural gas or biowaste opens other possibilities well into the future.

So diesel, in one form or another, will be used by heavy vehicles far into the 21st century.

Scania's first Euro 5 engines.

Euro 5 is legally required from October 2008 for new engines and one year later for existing engines. Particulate emissions remain at the same level as for Euro 4, 0.02 g/kWh, but NOx goes down from 3.5 g/kWh to 2.0 g/kWh.

From early 2006, Scania will introduce its first Euro 5 engines for both trucks and buses.

Customers demanding extra low emissions can thus choose from a range of Euro 5 engines and benefit from expected road fee and tax incentives three years in advance. These first Scania Euro 5 engines will use SCR aftertreatment.

Full range of Euro 5 engines – new injection technology.

The full range of Euro 5 engines, which will be introduced well ahead of the legal requirements, will entail a modified engine platform with new injection technology. EGR and variable turbo geometry will be used – but no aftertreatment will be needed to reduce NOx.

Scania XPI is a common-rail injection system that Scania is developing together with Cummins. XPI stands for extra high pressure injection. The system features higher injection pressures together with multistage injection, which creates new possibilities to increase efficiency in the combustion process. The result: even lower emissions as well as better fuel economy. This combination of technologies will

be used on all engines, including V8s. A maintenance-free oxidising catalyst will be integrated in the silencer.

Beyond Euro 5.

When it's time for the next step, around 2012, we expect emission standards and test methods to be more uniform across the world.

With the expected much lower emission levels of NOx and particulates, emissions of known substances will be so low that other issues will take over. Concerns about carbon dioxide emissions and the greenhouse effect are with us today and this focus will increase. Concerns about the availability of crude oil will increase the need to use the most fuel-efficient engine technology.

Its high efficiency means that the diesel engine will remain the ideal source of power for heavy road transport. Scania is developing a combination of common-rail injection, EGR and SCR, together with variable turbo geometry – a combination yet again targeted at lowering emissions while maintaining efficiency.

Looking ahead: 2020 vision.

EGR and SCR technologies will enable further reductions of emissions for the next decade or so. Scania is looking at other technologies to take the compression ignition principle even further into the future – say 10 to 15 years ahead.

For example, HCCI (Homogeneous Charge Compression Ignition) is a

high-priority research area for Scania. HCCI is based on the mixing of air and fuel before they enter the combustion chamber. Once this technique is mastered, both particulate and NOx emissions from the HCCI engine will be virtually non-existent.

Your immediate priorities.

The Euro 4 legislation enters into force in October 2005 for new engines and one year later for all new vehicles. Euro 5 is scheduled for 2008/2009. So the immediate focus is on Euro 4.

Scania, by developing technologies across a broad front, is in a strong position to offer suitable solutions with very good operating economy, performance and driver appeal for different transport tasks.



“We are working systematically to refine diesel engine technology. Our aim is to achieve the best fuel consumption within the framework of even lower emission.”

*Urban Johansson, Senior Vice President
Powertrain Development.*

- Scania is one of the world's leading manufacturers of trucks and buses for heavy transport applications, and of industrial and marine engines. The products are marketed in about 100 countries worldwide. Scania has more than 29,000 employees and production facilities in Europe and South America.
- Scania is one of the most profitable companies in its sector. The company has an unbroken profitability record that goes back to the early 1930s.
- Scania products are based on a unique modular set of building blocks that can be tailored in innumerable ways to match customer demands with optimum efficiency.
- All research and development is concentrated at the Scania Technical Centre and Head Office in Södertälje, Sweden. With 40 engine test cells and 20 km of closed test tracks, it is one of the largest facilities in the business.
- Scania's top development priorities are fuel economy, uptime and driver environment. Scania always puts the driver in command, supporting him or her to make the right decisions.
- Scania has an active role in society for advancing road safety, e.g. by gathering decision-makers, road safety experts and research bodies to top-level road safety conferences in Brussels in 1999, 2001 and 2003. Scania carries this heritage wherever it operates in the world.
- The Young European Truck Driver competition is an initiative that Scania has taken to promote the importance of driver competence for road safety and overall transport efficiency. Endorsed by the European Commission, it involves 28 European countries, including all new EU member states. A great success in 2003, the event will be repeated in 2005.
- Scania aims to continue to grow with sustained profitability, focusing on western Europe, which accounts for around 70 percent of sales, Latin America and markets in eastern Europe and South East Asia, where there is a growing road infrastructure. The annual production level is more than 50,000 trucks and buses per year, using the same product platform and the same quality and environmental standards worldwide.

Scania pursues an active policy of product development and improvement. For this reason the company reserves the right to change product specifications without prior notice. Vehicle data may vary from one market to another.

