

Manufacturing Environmentally Friendly Products

For the benefit of society, Isuzu is committed to creating a new value that makes it possible to balance curbing environmental impact with safety and economy.

See Technology

In pursuit of customers' trust is the engineering philosophy of Isuzu. The company aims to manufacture products that earn the trust of all customers and stakeholders. Based on this philosophy, Isuzu seeks to advance technology in three areas—safety, economy, and the environment. Our action is guided by the basic development concept called "See" technology. The "S" stands for safety, the first "e" for the economy and the second "e" for environment.

Led by the engineering philosophy and the basic concept, we develop technologies and create a new value for society that harmonizes our efforts to curb environmental impact with safety and economy.



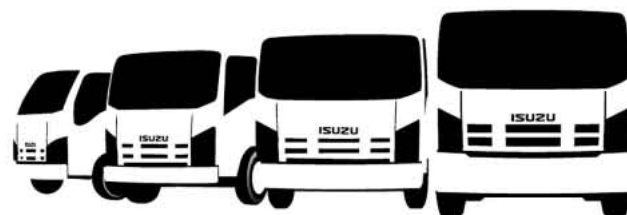
Eight Major Tasks

With the following eight priority tasks in engineering environmentally friendly vehicles, we are developing various technologies to minimize environmental impact throughout the life cycle of vehicles.

- Prevention of global warming
 - Restrictions on resource exhaustion
 - Prevention of air pollution
 - Quiet environment
 - Safe environment
 - Comfortable vehicle cabins
1. To improve fuel efficiency and reduce CO₂ emissions
 2. To make exhaust gases cleaner
 3. To develop clean-energy vehicles
 4. To reduce vehicle external noise
 5. To reduce environmental impact substances
 6. To improve recyclability
 7. To reduce air conditioner refrigerants
 8. To reduce VOC in vehicle cabins

Realization of the Basic Concept

Light-duty ELF and Medium-duty FORWARD Vehicles



In developing the new light-duty ELF and medium-duty FORWARD models, light-duty and medium-duty trucks were considered as one group, on the basis of the concept of See Technology. We have done complete model changes to these trucks to create internationally-popular trucks and to achieve global deployment of the project concept "SEE GLOBAL", where safety, economy and environmental performance are targeted from a global point of view.

In addition to compliance with the regulatory requirements of various countries, many country-specific conditions were taken into consideration in the development phase of this project to improve safety, economy and environmental performance. To meet all the requirements, an enormous number of design reviews were performed and numerous tests and simulations were repeated to attain the targeted performance. To become a leading company in the commercial vehicle and diesel engine industries, Isuzu has consolidated all of its accumulated knowledge and engineering power to address various country-specific requirements. As a consequence, we are developing trucks that satisfy requests from global customers by introducing system designs such as our module design.

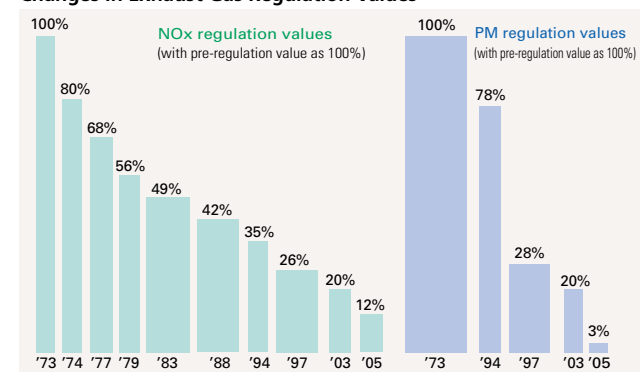


Fluid analysis simulation

I-CAS (ISUZU Clean Air Solutions)

I-CAS is Isuzu's next-generation clean technology that has incorporated the most advanced technologies to meet the various environmental requirements for trucks. It combines Isuzu's three key next-generation technologies—optimal combustion technology, after-treatment technology for exhaust gases, and electronic control technology—to reduce environmental impact from the overall aspect of the vehicle.

Changes in Exhaust Gas Regulation Values



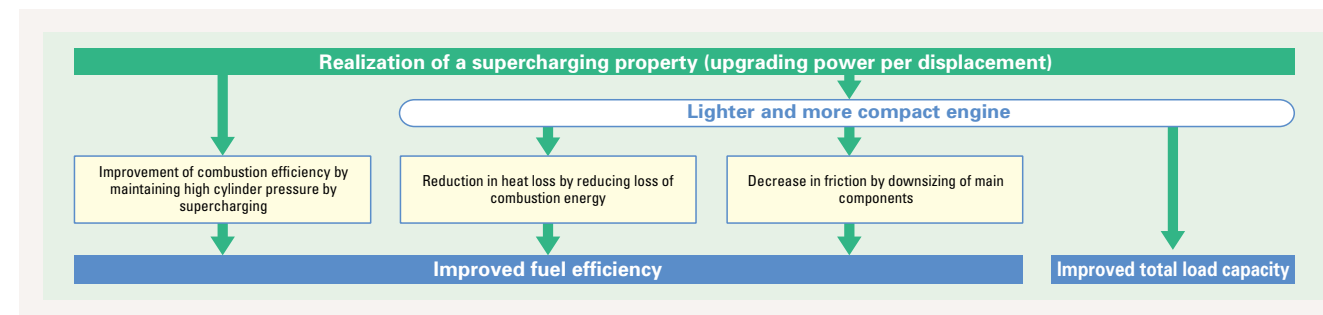
D-CORE

D-CORE is the name of the next-generation diesel engine series, accommodating Isuzu's original concept, technology and performance, where small displacement and supercharged diesel engines are presented as the core* technologies of future diesel engines. Downsizing through smaller displacement reduces the friction loss of each mechanism, and also improves fuel efficiency and reduces CO₂ emissions through weight reduction. Furthermore, a reduction in mechanical noise means quieter engines.

In a supercharged system, exhaust gas energy is collected to compress intake energy so that large quantities of air are supplied to the combustion chamber. By efficient use of this high amount of energy to ensure high engine torque and output, a further cleanup of exhaust gases, low fuel costs and a reduction in CO₂ emissions could be achieved.

*Core: A main, important part.

D-CORE Achieved both Environmental Performance and Economic Performance



D-CORE Series

4JJ1-TCS

The 4JJ1-TCS engine that has been integrated in the light-duty ELF truck achieves both revolutionary environmental performance through conformance to the new long-term emissions regulations and low-emission truck certification, as well as conformance to the 2015 fuel efficiency standard. The engine offers power and torque that are far beyond the capabilities of conventional three-liter engines.



4HK1-TC

The 4HK1-TC engine that has been integrated in the medium-duty FORWARD truck achieves both revolutionary environmental performance through conformance to the new long-term emissions regulations and low-emission truck certification, as well as conformance to the 2015 fuel efficiency standard.



6UZ1-TCS

The 6UZ1-TCS engine that has been integrated in the heavy-duty GIGA truck achieves both revolutionary environmental performance through conformance to the new long-term emissions regulations and low-emission truck certification, as well as conformance to 2015 fuel efficiency standard. The efficient use of combustion energy minimizes energy loss and improves fuel efficiency. By making the engine more compact, weight is reduced and the maximum load capacity is maximized.



■ Heavy-duty Truck GIGA

The heavy-duty GIGA truck integrates the 6UZ1-TCS engine, a flagship model in the D-CORE Series, while conforming to the new long-term emissions regulations in all vehicles utilizing I-CAS technology.



■ Heavy-duty Route Bus ERGA

The heavy-duty ERGA route bus integrates the 6HK1-TCC engine in the D-CORE Series while conforming to both the new long-term emissions regulations and the requirements of the low-emission truck certification.



■ D-MAX

The D-MAX pickup truck integrates either the 2.5-liter 4JK1-TC or the 3-liter 4JJ1-TC engine in the D-CORE Series and satisfies the requirements of EURO 4, the stringent European emission regulations.



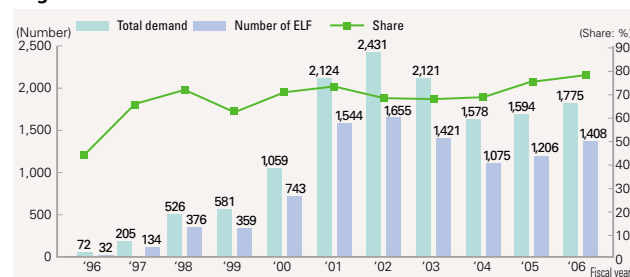
■ Development of an Eco-car

While Isuzu's primary policy is to make exhaust gases from diesel engines cleaner with excellent combustion efficiency, we are also actively developing low-pollution trucks such as the CNG and hybrid vehicles to enable further reductions in CO₂ and air pollution substances, as well as to ensure energy security.

Development of CNG Vehicles

CNG vehicles run on natural gas. They have distinct advantages over diesel vehicles in terms of exhaust emissions such as NO_x and PM, which seriously affect air pollution in urban areas. With lower CO₂ emissions, CNG vehicles are promising as low-pollution, alternative energy vehicles. Registration of the ELF CNG reached 10,000 units in April 2007.

Registered ELF CNG Vehicles



Development of Diesel Hybrid Vehicles

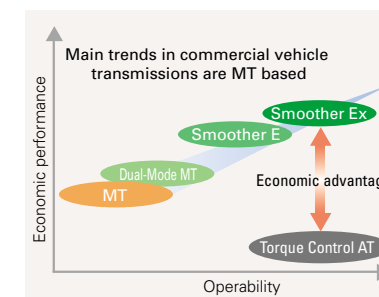
Isuzu's ELF Diesel HYBRID has achieved low CO₂ emission and low fuel costs by efficiently using the deceleration energy of the vehicle.



■ Smoother

"Smoother" is Isuzu's unique easy-driving system that enables computer-controlled automatic gear shifting and sequential manual gear shifting functions. A high-efficiency transmission is achieved by adopting fluid coupling with a lockup clutch and wet-type multi-disk clutch. Powerful driving performance and excellent fuel efficiency are realized by the optimal lockup control.

The light-duty ELF truck integrates Smoother Ex and the FORWARD medium-duty truck integrates Smoother Fx.

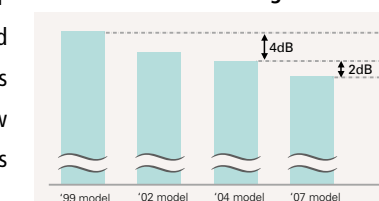


■ Reduction in Vehicle External Noise

Isuzu is working not only to comply with the world's most stringent noise regulations, but also to reduce idling noise and to improve the unpleasant tone of diesel engine noise. Major efforts have focused on reducing engine and drivetrain noise, studying an optimal sound insulation structure by analysis of noise and its transmission route, and research and development of high-performance sound-absorbing materials.

Idling noise in the ELF light-duty truck, released in December 2006, was reduced to 2 dB below that of the previous model.

Transition of the ELF idling noise



■ Improvement in Recyclability

Isuzu is making various efforts at each stage in a vehicle's life cycle, to reduce environmental impact. Consideration is given to the reduction of waste at the design stage. The company is also working to find ways of using recycled material. It has developed a console box, which comprises 52% recycled material, which has already been used in Isuzu's vehicles, from light-duty to heavy-duty trucks (see p. 31-p. 32).

■ Reduction in Environmental Impact Substances

We have prepared guidelines for regulating the use of four heavy metals, to comply with the EU-ELV (European Union End-of-Life Vehicles) directive and the Japan Automobile Manufacturers Association's voluntary restraints. Efforts to reduce environmental impact substances are underway, with mercury already banned, except where its use is permitted. To achieve these goals, we are switching from lead, cadmium and hexavalent chromium to alternative substances. The ELF, released in December 2006, achieved a reduction in the use of lead of 1/10 over the 1996 level.



Lead-free balance weight (above: 17.5 inch type/iron; below: 15.16 inch type/zinc)

Lead	Usage in and after 2006 will be reduced to 1/10 or less of 1996 levels (1/4 or less for heavy-duty commercial vehicles).
Hexavalent chromium	Use in new vehicles will be gradually banned from 2003 through 2008.
Cadmium	Use in new vehicles will be gradually banned from 2003 through 2007.
Mercury	Use in new vehicles was banned following the enforcement of the automobile recycling law in January 2005, except for use on some lighting fixtures and display equipment.

■ Reduction in Air Conditioner Refrigerants

Since the alternative refrigerant HFC134a is also a greenhouse gas, we set a target to cut its use by 20% below 1995 levels. The usage is now 44% lower than before. Also under development is an air conditioning system that uses CO₂ or other substances as a refrigerant.

■ Reduction in VOC in Vehicles

At Isuzu, we are taking measures to cut VOC¹ in vehicle cabins, in line with the Japan Automobile Manufacturers Association's policy for voluntary reduction efforts. There are a total of 13 hazardous substances designated by the Ministry of Health, Labor and Welfare.

Light-duty ELF trucks, medium-duty FORWARD trucks and heavy-duty ERGA² route buses complied with the guidelines of the Ministry of Health, Labour and Welfare.

1 VOC: Volatile organic compounds such as formaldehyde and toluene
2 In combined use with a ventilation fan