The Life Cycle of Vehicles and the Environment

Automobiles can impact the environment at all stages of their life - from raw material extraction, through to manufacturing and use, recycling and disposal. As a result, major environmental challenges have to be faced at all of these stages, ranging from global issues such as climate change and depletion of natural resources; regional issues such as acid rain caused by pollutants from combustion of fossil fuels; and local issues such as urban air pollution, which can directly affect human health.
Life cycle assessment studies show that the majority of environmental impacts arise from the use of the vehicle. At this stage of the life cycle, the type of engine and transmission technology used, along with the type of fuel required, and the way in which the vehicle is driven and maintained, are all critical elements in determining the extent of the impacts. However, for preventive measures to be effective the process must begin at the design stage – thereby lowering environmental impacts at every subsequent stage.

Toyota and the Life Cycle of Vehicles

Toyota in Europe considers activities across all stages of the vehicle life cycle, from design and development, purchasing, manufacturing, marketing and distribution, through to sales, after sales and end-of-life services.

In Europe, as new plants and logistic centres are being opened, the range of Toyota and Lexus vehicles expands and Toyota's market continues to grow, Toyota needs to balance the management of new sites and an increasing vehicle fleet, with the identification and development of sustainable solutions that promote environmental conservation and resource efficiency.

Toyota in Europe adopts proactive environmental measures throughout the vehicle life cycle, combining legislative obligations with the best technological solutions for customers' demands, manufacturing considerations, and product requirements such as quality. The key to success starts with the application of innovative technology at the vehicle design and development stage.
Innovation in product design is driven by the pursuit for the ultimate "eco-car" through the development of alternative-energy systems, like the hybrid, and the improvement of internal combustion engines. In addition, it means focusing on new materials, which are less harmful or more recyclable, as well as the use of recycled materials for vehicle components. Innovation at this stage of the vehicle life cycle ensures Toyota can lessen the burden on the environment throughout the whole life cycle.

End of Life

Design and Development

Logistics, Marketing, Sales and After Sales

Purchasing and Manufacturing

A Global Approach, Sensitive To Local Needs

Being one of the world's leading automotive companies, Toyota, through its Earth Charter, has taken a global commitment to positive action for the environment. In this scope, product development strategies incorporating environmental considerations are regarded as a global challenge and therefore a common approach is lived up to worldwide.
Nevertheless Toyota understands that, when planning detailed environmental impact prevention actions along the vehicle life cycle, local issues must also be considered, and local constraints faced. When pursuing the ultimate "eco-car", since energy concerns, economic conditions and traffic situations are different by region, Toyota is aware that it will need to be different to meet the needs of each region. This reflects Toyota's idea of "the right car for the right place at the right time".

Toyota relies on a world-spread system for collection, analysis and information exchange. For example, to verify whether clean fuels are available and if recycling infrastructures are in place. This information is incorporated into the business process throughout the vehicle life cycle, continuously broadening knowledge with respect to achieving ongoing sustainable improvements at both the local and global level.

The following sections of this Report provide readers with a comprehensive insight into the environmental protection and impact prevention measures taken by Toyota in Europe and related to vehicles available on the European market. The vehicle life cycle and value chain are tracked, starting from design and development of clean and easy recyclable automobiles while pursuing a zero emission vehicle (first section). The second section deals with the environmental approach in purchasing adopted in Europe and with manufacturing in plants utilising state-of-the-art and best available process technologies. The remaining two sections give information on how logistics is being organised to minimise its impacts and on the end-of-life recovery and recycling perspective in Europe. Any relevant information and data linked to each life cycle stage are reported, and detailed results of actions undertaken are profiled in the 'In Focus' sections.
With regard to the 'In Focus' sections relating directly to individual NMSCs, these were selected to give the broadest view possible of the different interpretations attributed to environmental protection. They cover a range of NMSCs, some that are forging ahead or playing a major role in public debate due to their leading market position in the country; or others, succeeding in confronting and/or co-operating with local national auto manufacturers.

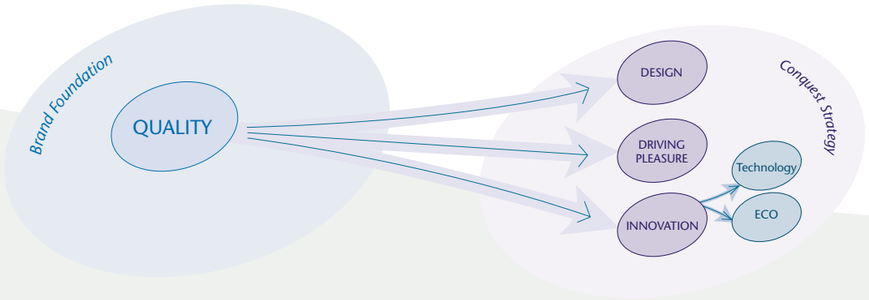
Design and Development

Thinking for the European Market

Developing and marketing vehicles, whilst achieving top level environmental performance, should be a top priority for any responsible automobile manufacturer.
In design and development, Toyota has actively researched a number of key environmental areas:

> Research and development of **clean energy vehicles**
> Enhancement of **fuel efficiency**
> Reduction of **exhaust emissions**
> Reduction in the use of **dangerous substances**
> Enhancement of **design for recycling**
> Enhancement of the use of **recycled materials**
> Reduction of **external automobile noise**

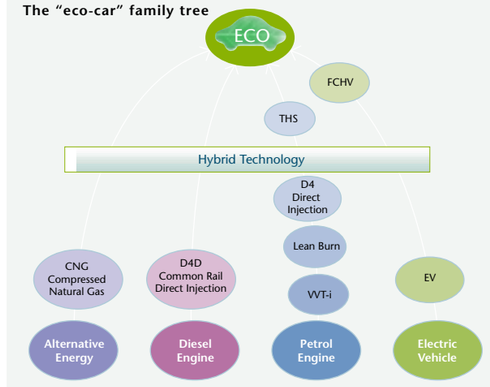
In the European market, Toyota is committed to complying with European Union (EU) legislation requiring vehicle recycling, reductions in exhaust emissions, and a ban on the use of heavy metals. Furthermore, through its "Design for Recycling" research and use of recycled materials, Toyota is highly active within the recycling infrastructure and markets for recycled materials in Europe.
All these goals meet the expectations of European stakeholders, many of which have been highlighted by the EU's bolstering of public environmental awareness and involvement in pollution prevention. The EU's sixth "Environmental Action Programme", covering the period 2001-10, focuses on preventive measures, pollution management at source, the "Polluter Pays Principle", and the substitution of dangerous substances with less harmful ones. Market surveys commissioned by Toyota confirm that customers in Europe are becoming increasingly more environmentally conscious. And without doubt, the environment has now become a core strategic planning issue.
Toyota considers quality as the foundation of its brand in Europe. Design, driving pleasure and innovation are the building blocks of Toyota customers conquest strategy; innovative technology and ECO (Ecology) are key product qualities.



Putting Green Technologies into Practice: Toward the Ultimate "eco-car"

Toyota's personal transportation vision of the future is a vehicle that has minimal environmental impact, but possesses all the familiar levels of comfort, convenience and safety available today. The ultimate "eco-car" means clean transport and achieving the goal of a zero emissions vehicle.

The "eco-car" family tree



On the road to achieving zero emissions, Toyota is researching on a wide range of technologies, including electric, hybrid and fuel cell powertrains. While **electric vehicles** are, de facto, emissions free, they have a limited travel range and require regular recharging - limiting consumer acceptance. **Hybrid power** could be a promissing option when people have longer distances to travel. Hybrid technology combines an electric motor with a range of power sources, including fuel cells. **Fuel cells** offer an exciting long-term potential. Currently these kinds of alternative technologies are researched and tested in Japan and are only marketed abroad when fully developed. The emergence of a new type of vehicle does not necessarily mean the demise of an old one. As Toyota progresses towards development of the ultimate "eco-car" in the coming years, hybrid technology is certain to co-exist alongside improved versions of **conventional internal combustion engine-powered** vehicles.

On the Road to Zero Emissions

Toyota has adopted a multilateral approach to development of the ultimate "eco-car". Major milestones of the project have been the launch of Prius and the development of Fuel-Cell Hybrid Vehicles (FCHVs). Meanwhile, other hybrid technology vehicles (THS - Toyota Hybrid System) are also being explored. Toyota plans to increase hybrid car production, and aims to reach global production of 300,000 units per annum by 2005.

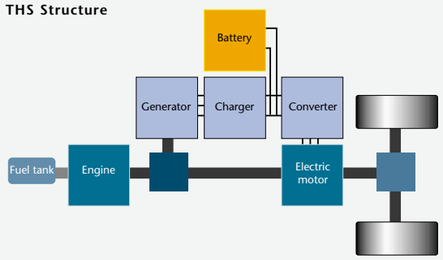
The Hybrid System

Prius- the First Mass-Produced Hybrid Vehicle

Prius is the first mass-produced hybrid technology vehicle in the world and is now being sold in Europe, the USA and Japan. Prius is a long-term project through which Toyota intends to become a market leader in hybrid technology, and achieve its long-term "zero emissions" aim.
Prius offers impressive fuel efficiency and low emissions levels in an urban cycle. The car is suitable as everyday family transport and, in contrast to conventional cars, provides better fuel economy in city driving than motorway driving.

Overall, fuel consumption is approx. 5.1litre/100km in the EC combined mode[1], corresponding to an emissions value of 120g CO_2/km. In urban traffic, real-life fuel consumption is about half that of a similar-sized conventionally powered vehicle. Thanks to its fuel efficient 1.5 litre VVT-i engine (Variable Valve Timing-intelligent), sophisticated control during warm-up and a catalyst that is extremely efficient in all driving conditions, Prius' emissions are almost 50% below European 2005 emissions limits. This is, in part, due to the possibility of Prius running on electric power alone when at low speeds. In traffic jams, for example, this means no emissions.

THS Structure



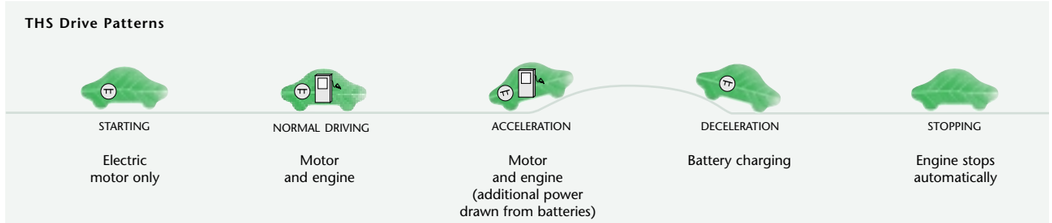
How the Hybrid System Works

The Prius hybrid system has two main driving components: a petrol engine and an electric motor powered by a high-voltage nickel-metal hydride battery pack. The key aspect of the system is its computer management, which automatically calculates which mix of energy is required, depending on speed and driving conditions.
Operation of the THS in various driving situations is as follows:

> **Starting from stand still/ stopping or low energy demand:** the electric motor powers the car
> **Normal driving:** a power split device divides the engine output between the wheels and the generator. The generator powers the electric motor, which can drive the wheels as well as recharge the battery
> **High speed and heavy load conditions:** both the engine and the motor drive the wheels; additional power flows to the motor from the battery
> **Deceleration/ braking:** the wheels drive the electric motor, which acts as generator and recharges the battery
> **Stopping:** the engine stops automatically, unless it is necessary to charge the battery and/or run the airconditioning compressor

[1] *Combined Cycle (Extra urban-urban-combined); ref. 1999/100/EC*

THS Drive Patterns



Design and Development

The Four-Wheel Drive Hybrid Multi Purpose Vehicle

In June 2001, Toyota introduced the THS-C (Toyota Hybrid System-CVT) hybrid system in Japan for its innovative minivan Estima Hybrid (Estima is the Japanese equivalent of the Previa). This is the world's first mass-produced petrol driven, electric four-wheel-drive hybrid vehicle. This vehicle combines three key power-management technologies. These are:

1. THS-C, featuring a 2.4 litre petrol engine, CVT (Continuously Variable Transmission) and an electric motor for front-wheel power
2. E-Four, which regulates a rear-mounted, rear-wheel-propelling electric motor and co-ordinates electric power distribution to all four wheels
3. ECB (Electronically Controlled Brake System), for efficient wheel-by-wheel brake control and optimum management of the vehicle's regenerative braking system.

This minivan rivals the fuel efficiency of compact cars, greatly reduces CO_2 emissions and slashes exhaust emissions.

Fuel Cells Hybrids

Ever since Toyota began the fully-fledged development of Fuel-Cell powered hybrid vehicles (FCHVs) in 1992, the company has been actively promoting them. In 1996, Toyota demonstrated a FCHV that stores hydrogen in a hydrogen-absorbing alloy unit and, in 1997, unveiled a FCHV featuring a methanol reformer for the on-board creation of hydrogen. At the same time, Toyota began conducting wide-ranging research on fuel types, such as CHF (Clean Hydrocarbon Fuel), an evolved form of petrol. Even though FCHVs are becoming more of a reality, Toyota believes mass production is only likely to begin by 2010 at the earliest – if not later. In fact, only when the remaining technological and fuel-distribution issues are solved can fuel cells become a realistic, mass-volume alternative.

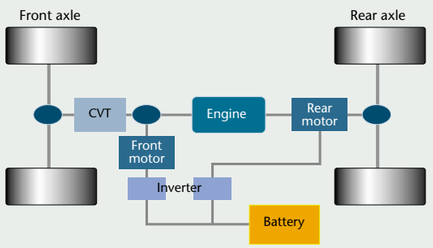
This being said, Toyota plans to introduce fuel cell vehicles to the market on a limited basis in 2003.

Toyota's Latest Achievements

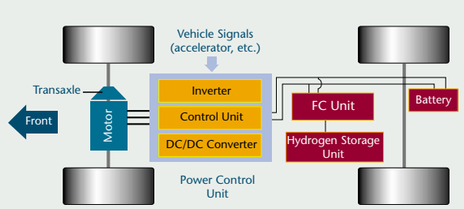
New types of fuel cell hybrid vehicles have been developed since the beginning of 2001: the FCHV-3, was introduced at the International Fuel Cell Vehicles Symposium (March 2001); and the FCHV-4 began road tests in Japan in June 2001. These tests include a three-year period of data gathering. Data will be applied to the development of a thoroughly practical FCHV. Both vehicles are powered by pure hydrogen and are provided with a secondary battery (nickel-metal hydride) for storing energy created during braking. Hydrogen is stored in an absorbing alloy for the FCHV-3 and in high-pressure tanks for the FCHV-4. Furthermore, the FCHV-4 has a newly developed heat pump air-conditioning system that uses CO_2 as the refrigerant instead of HFCs (Hydrofluorocarbons).

Also, in June 2001, tests were started on a fuel cell hybrid bus (FCHV-bus 1) in Japan. It is a low-floor city bus, powered by high-pressure hydrogen fuel cell hybrid system.

Estima Hybrid System



FCHV Structure



Powertrain Technologies: Rethinking the Conventional

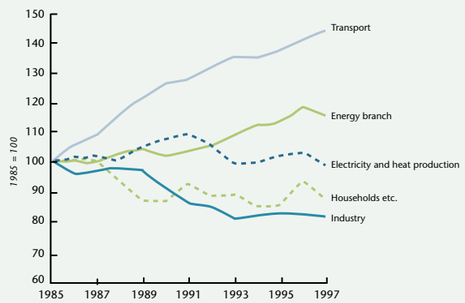
Toyota knows that the future may not belong to the internal combustion engine. Nevertheless, even if research progresses, the internal combustion engine will remain the dominant technology in the near future. Rethinking the approach to engine design may allow the delivery of internal combustion engines with improved environmental performance for the years to come. As early as December 1989, Toyota began to launch a series of cars equipped with lean-burn engines, direct injection petrol and diesel engines and common rail diesel engines. These technologies, along with others such as VVT-i throughout the petrol range, have greatly helped to reduce fuel consumption and exhaust emissions.

Carbon Dioxide

Carbon (C), contained in petrol and light oil, is converted through combustion inside an engine into carbon dioxide (CO_2). Carbon dioxide is the predominant "greenhouse gas" (GHG) in our atmosphere, and GHGs are considered to be the primary source of global warming. In the EU, CO_2 emissions have increased by 40% since 1985, with transport being one of the main causes of this rise. This is due to growing traffic volumes and the consequent growth in (fossil) fuel consumption. Considering CO_2 emissions resulting from human activity only (fuel combustion, industrial processes, waste, etc.) in 1998, 25% of emissions from fuel combustion were attributable to transport. This is equivalent to more than 23% of the total manmade CO_2 emissions.

By 2010, CO_2 emissions are expected to increase by a further 30%. The EU has a tough challenge on its hands if it is to meet its Kyoto Protocol targets.

Trend in CO_2 emissions from fossil fuels in Europe[2]



[2]According to European Environmental Agency "Emission Inventory 1990-1998", October 2000

Cutting Fuel Consumption

Car users consider fuel consumption an important issue and not only for economical reasons. They are becoming increasingly aware of environmental problems and are aware that fuel consumption and CO_2 emissions are closely related.

In fact CO_2 emissions in grams per kilometre are directly linked to consumption in litres per kilometre.

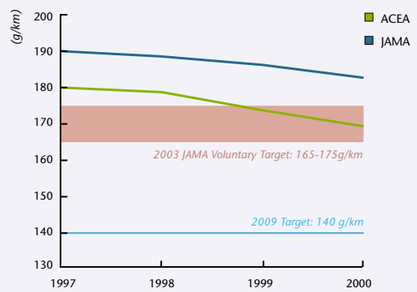
In Japan, the government has fixed some limits on fuel effficiency.

In the European Union, there are some voluntary agreements on CO_2 emissions from vehicles, between the EU and auto manufacturers.

Voluntary agreements on CO_2

Under the Kyoto Protocol, the EU has accepted an emission reduction target of 8% relative to 1990 levels, which is to be achieved for a series of greenhouse gases, including Carbon Dioxide (CO_2), by 2012. In recognition of the importance of passenger cars as a source of CO_2 emissions, the European Commission has proposed a Community strategy to reduce CO_2 emissions from passenger cars and to improve fuel economy. One of the main elements of the strategy is to reach environmental agreements with the automobile industry. Currently, some voluntary agreements are in place. One, with the European Automobile Manufacturers Association (ACEA), aims to gradually reduce emissions from new vehicles sold in Europe by its members to 140g/km[3] by 2008. Another, with the Japan Automobile Manufacturers Association, (JAMA) aims for a target of 140g/km CO_2 by 2009, with an intermediate step in the range of 165 to 175 by 2003. Toyota is a JAMA member.

Voluntary Agreements
Trend in Average Specific Emission (ASE)[4] CO_2



[3]An emission level of 140 g CO_2/km is equivalent to average fuel consumption of 5.3litre/100 km for a diesel vehicle and 5.9litre/100km for a petrol vehicle

[4]ASE on the total volume of cars sold on the market

Design and Development

Toyota Yaris

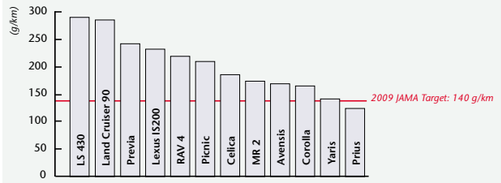
Yaris has been designed in Europe for European customers and was voted "Car of the Year 2000" in Europe. Yaris has also been recognised as "best-in-class" for its excellent safety record (according to the European crash test partnership, Euro NCAP). With more than 195,000 units sold in 2000, the Yaris has quickly become Toyota's number one performer in Europe.

In 1999, the Yaris won the prestigious "Engine of the Year" award for its 1.0 litre VVT-i engine and in 2000, the "Engine of the Year" award in the 1.0 to 1.4 litre category, with its 1.3 litre (NZ) VVT-i engine. VVT-i (Variable Valve Timing-intelligent) technology -around which this winning engine is based - controls the intake valves, closing them sooner at low engine speeds to reduce throttling losses, leaving them open at high speeds to reduce pumping losses to the cylinder.

CO_2 Performances: Ongoing Commitment

As a JAMA member, Toyota is committed to increasing its CO_2 reduction efforts by attaining an average emissions reduction in all its models. This average is 140g/km, and putting this in place across all new models is a challenging objective. Among the Toyota models currently on the European market, several models can achieve CO_2 emissions levels below 140g/km, such as Yaris and Prius. However, meeting this target throughout its range means bringing fuel consumption of its new fleet (including 4x4, MPV's, large family saloons, etc.) down to a level equivalent to the most fuel efficient cars on the market, such as Yaris 1.0 litre.

Toyota ASE CO_2 per model (year 2000)



The main actions being taken, in terms of CO_2 emissions, that are having an impact on cars available on the European market centre on the development and application of D4 injection petrol, the D4D diesel engines, and the smaller, lighter petrol engines.

D4 Injection Petrol

Toyota was one of the first companies to introduce direct injection engines. In this type of engine, the fuel is injected directly into the cylinder with a high pressure slit nozzle injector. This technology helps increase the compression ratio, thereby improving the combustion efficiency; it is usually additionally combined with VVT-i technology. In 2000, the Avensis was provided with a new 2.0 litre D4 engine, achieving a 7% decrease in fuel consumption from 8.3litre/100km to 7.7litre/100km.

D4D Diesel Engines

The Toyota D4D engine is amongst the most advanced in the world and is a clear example of Toyota's use of intelligent technology. D4D is a direct injection diesel engine in which the high pressure, common rail diesel injection system is fitted to a highly efficient, four cylinder, 16-valve engine. This technology further reduces consumption, emissions and noise. D4D diesel engines were introduced in 2000 and are now available, in a 2.0 litre version, in Avensis, Previa and RAV 4.

Small, Lighter Petrol Engines

Next-generation petrol engines (NZ) were employed in 2000 for Yaris and Yaris Verso. In order to be lighter and smaller, the NZ engine series features an aluminium block and the use of plastics and stainless steel in the intake and exhaust systems. The series also adopted VVT-i.

Reduction of Exhaust Emissions

Human health is affected by air pollution and photochemical smog, especially in urban areas. Road traffic is also one of the main sources of air pollutants.

Main exhausts hazards

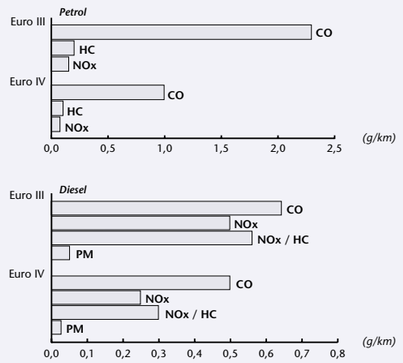
> Carbon monoxide (CO), produced by the incomplete combustion of fuel
> Unburned hydrocarbons (HC), contribute to tropospheric ozone formation
> Nitrogen oxides (NOx), formed by the reaction between oxygen and nitrogen contained in the intake air, under the effect of temperature; contribute to the formation of acid rain, smog and tropospheric ozone
> Particulate matter (PM), particulates from combustion containing carbon and volatiles are an issue of concern for human health

For some considerable time, Toyota has been working on reducing the pollutants contained in exhaust emissions. Actions for the reduction of pollution should enable full compliance with European emissions requirements.

European Exhaust Gas Regulations for Passenger Cars

The EU has issued a series of Directives on emissions limits for both petrol and diesel vehicles. Passenger vehicles put on the market after January 2000 must fulfil the Euro III Directive, whereas new vehicles sold after January 2005 will meet Euro IV. Some Member States, such as Germany, Sweden and the Netherlands, introduced tax incentives for vehicles complying ahead of EU deadlines.

Emission limits according to EU Directives[5]



[5] *Standard driving profile*

Low Emission Clean Petrol Engines

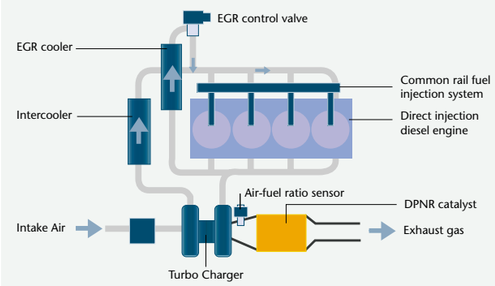
In addition to the Prius, other Toyota models available on the European market comply with Euro IV (type 1 test). These are the new optimised VVT-i petrol engine Avensis VVT-i 1.8 litre, the Lexus LS 430, SC 430 and GS 430. The Yaris 1.5 and Yaris Verso 1.5 are technically able to meet Euro IV test limits and are awaiting EU approval.

The main technologies that have helped reduce exhaust emissions include the use of (1) VVT-i, (2) a rearward exhaust layout[6], (3) a stainless steel exhaust manifold[7], (4) a thin-wall ceramic catalytic converter, and (5) a fuel atomising injector.

Cleaner Diesel Engines

Diesel-powered vehicles are in high demand in Europe due to the economic efficiency of the most recent models. These now account for about 35% of the passenger car market. With this in mind, Toyota has designed a new 1.4 litre, in-line four cylinder, eight valve direct-injection common rail diesel engine for Yaris. Toyota plans to build the new diesel engine in Japan initially, with introduction in Europe due at the end of 2001 through imports of Japanese-produced Yaris. At a later date, the engine itself will be produced in Europe. Toyota has also recently announced the development of a state-of-the-art, "ultra clean" diesel catalytic converter, the DPNR (Diesel Particulate NOx Reduction System). This new catalytic converter system can simultaneously, and continuously, reduce particulate matter and NOx in diesel exhaust gas. DPNR will lead the way in emissions reductions with a direct-injection diesel engine featuring the latest common rail, electronically controlled fuel injection technology. DPNR technology requires fuel with a low sulphur content to maintain a high conversion efficiency for a long duration. Toyota plans to introduce vehicles featuring DPNR in the Japanese market from 2003 while the introduction in Europe will depend on the widespread availability of low sulphur fuels.

After treatment for diesel (DPNR)



[6] *Rearward exhaust layout: since a catalytic converter works more efficiently at high exhaust temperatures, the exhaust pipe of an inline engine is placed in the rear, close to the catalytic converter*
[7] *Stainless steel exhaust manifold: it has a small thermal capacity and therefore quickly raises the exhaust temperature*

Design and Development

Focus On Materials

The European Union's environmental policy makes clear that some materials and substances used in vehicle production are potentially harmful to the environment. The prevention principle is a core principle of the EU's sixth "Environmental Action Programme" and is strongly emphasised in EU Directive 2000/53 – often termed the "End-of-Life Vehicles (ELV)" Directive.

The ELV Directive's main principles concerning vehicle design, service parts and accessories (Art. 4) are:

(a) vehicle manufacturers, in liaison with material and equipment manufacturers, should limit the use of hazardous substances and reduce them as far as possible from the vehicle concept stage onwards

(b) the design and production of new vehicles should take fully into account and facilitate dismantling, re-use and recovery

(c) vehicle manufacturers, in liaison with material and equipment manufacturers, should integrate an increasing quantity of recycled material, in order to develop the markets for recycled materials

In addition to the EU Directive, an ISO standard on "recyclability and recoverability", agreed by all large automotive manufacturers, is also at the final stages of preparation. When issued, it will further strengthen the need for action on these issues.

Reducing Substances of Environmental Concern

The ELV Directive requires that materials and components of the vehicles put on the market after July 2003, do not contain Lead (Pb), Cadmium (Cd), Mercury (Hg) and hexavalent Chromium (Cr6+), other than in cases specified in the exemption list "Annex II" of the Directive. The main purpose of this ban is to reduce the quantity of hazardous waste produced during disposal.

Finding substitute materials is often a challenge for design engineers who must also guarantee product performance. However, Toyota is working hard to reduce hazardous chemicals in all its operations.

One example is the new Corolla produced at TMUK, where Toyota has succeeded in developing parts which are now lead free. For example, the wire harness traditionally required lead for heat resistance, but Toyota has developed an alternative heat resistant material for the wire harness which contains no lead. Other examples include the radiator, heater core, fuel hose, and the fuel tank.

Lead free wire harness

Aware of the potential impact of hazardous materials - during both manufacturing and recycling - Toyota has developed an internal list of so called "Substances of Environmental Concern" (SOC). These substances must either be monitored, reduced, or eliminated from Toyota vehicles. The list is also submitted to Toyota's suppliers through the European Environmental Purchasing Guidelines (see Purchasing and Manufacturing section). Suppliers are requested to implement the list and submit relevant data, as evidence of their actions.

Toyota's Material Engineering divisions identify and manage "Substances of Environmental Concern" and are conducting research aimed at substitution at the design stage.

Enhancing Use of Recycled Plastic Materials

According to the ELV Directive, vehicle manufacturers, with the support of equipment manufacturers, are now being required to increase the use of recycled materials in vehicles. In particular, the recycling of all plastics from end-of-life vehicles should be continuously improved.

Whilst investigating the importance of recycling for the future, Toyota is focusing its attention on the use of recycled materials and the recycling of plastic waste.

Recycling: the reprocessing in a production process of the waste materials for the original purpose or for other purposes but excluding energy recovery.

Usage of Recycled Materials

In 2000, the following actions were taken:

> Identification of parts where recycled plastics can be used

> Definition of quality constraints when using plastic recycled material

> Investigation of European recycling companies to verify their supply capacity in Europe, the technology they use and the quality of their products

The use of recycled plastics may lead to some technical problems. Therefore, efforts must be devoted to overcome these problems in order to boost the use of plastic recycled materials, where technically and economically feasible. As a result of these efforts, some recycled plastic materials are now used in several parts of the new Corolla.

Investigation into further applications are being performed and the use of recycled plastics will be further enhanced.

Re-using Plastic Waste

Toyota's British and French plants recycle waste derived from the manufacture of plastic parts. Currently, in the production of bumpers, the plastic production scrap is recycled internally during the production of new bumpers.

Use of plastic recycled materials (new Corolla)

Silencing Cars

Making continual reductions in the noise produced by cars is a difficult task. Conflicts with other design requirements are likely to occur when, for instance, reducing vehicle weight to improve fuel efficiency or installing new exhaust abatement devices. A comprehensive approach, which balances these requirements and embraces the entire design, should then be taken, and Toyota is making significant efforts in this area.

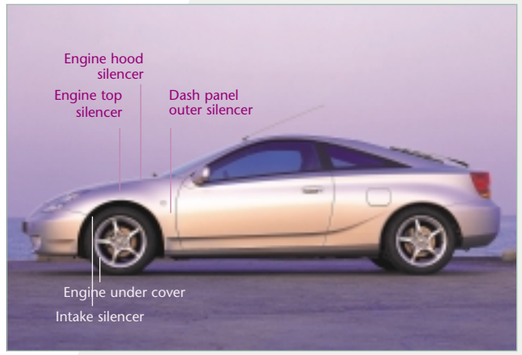
Hybrid technology is a successful example. At low speeds the performance of hybrid cars, like the Prius, is outstanding. When at low speed, the petrol engine is switched off and is completely silent. The only remaining noise is from the tyres and the electric motor. The noise emission rate is much lower than that attained by a traditional engine.

All Toyota and Lexus models now on the market are equipped with noise reduction devices, allowing full compliance with mandatory external noise level limits. Noise reduction measures focus on the main sources of external noise in the car, i.e. the engine, the fan, the intake system, the exhaust system and the tyres. Examples of engine noise reduction measures are the installation of rubber insulators and sound-absorbent engine undercovers.

Models	Noise Reduction Measures				
	Engine top silencer	Engine hood silencer	Dash panel outer silencer	Engine under cover	Intake silencer
Prius			a		a
Yaris		a *			
Corolla	a	a	a		a
Avensis		a	a	only diesel	a
Celica	a	a	a	a	a
RAV4		a	a	only diesel	a
Previa		a	a		a
Land Cruiser		a	a	a	a
Lexus LS 430	a	a	a	a	a

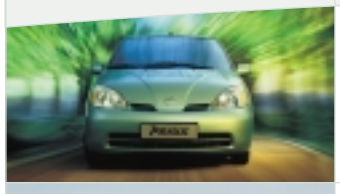
** not available on Yaris 1.0 base model*

Noise reduction measures (Celica)



Vehicle Environmental Performance Data

Vehicle environmental performance data (data refers to European manual transmission models only and to any models mentioned in this report).
For details on other models, please consult local Dealers.

	Model	Engine	Fuel Type	Fuel Consumption[1] [l/100 km]	CO_2 [g/km]	Euro Standard	Drive-by Noise Level dB(A)[2]	Emissions[3]				
								CO	HC +NOx	HC	NOx	Parti-culates
	Prius	1.5 litre	Petrol	5.1	120	IV	71.0	0.630	n/a	0.050	0.050	n/a
	Yaris (3-door)	1.0 litre VVT-i	Petrol	5.7	137	III	69.0	0.910	n/a	0.150	0.020	n/a
	Yaris (5-door)	1.3 litre VVT-i	Petrol	6.0	144	III	70.0	0.880	n/a	0.100	0.040	n/a
	Corolla (5-door lift back)	1.4 litre VVT-i	Petrol	6.8	162	III	71.0	0.380	n/a	0.110	0.070	n/a
	Corolla (5-door lift back)	1.6 litre VVT-i	Petrol	7.0	168	III	71.0	0.800	n/a	0.130	0.050	n/a
	Avensis (4-door)	1.8 litre VVT-i	Petrol	7.4	176	IV	73.0	0.540	n/a	0.040	0.020	n/a
	Avensis (4-door)	2.0 litre D4D	Diesel	5.9	158	III	73.0	0.330	0.520	n/a	0.490	0.044

	Model	Engine	Fuel Type	Fuel Consumption[1] [l/100 km]	CO_2 [g/km]	Euro Standard	Drive-by Noise Level dB(A)[2]	Emissions[3]				
								CO	HC +NOx	HC	NOx	Parti-culates
	RAV4 (4 WD)	2.0 litre	Petrol	8.8	211	III	73.0	0.610	n/a	0.070	0.040	n/a
	Land Cruiser LC 90 (4WD)	3.0 litre D4D	Diesel	9.5	253	III[4]	73.0	0.310	0.650	n/a	0.620	0.061
	Celica	1.8 litre VVT-i	Petrol	7.7	185	III	73.0	1.220	n/a	0.130	0.030	n/a
	Previa	2.4 litre VVT-i	Petrol	9.5	228	III	72.0	0.890	n/a	0.070	0.090	n/a
	LS 430	4.3 litre VVT-i	Petrol	12	289	IV	72.0	0.230	n/a	0.040	0.020	n/a
	IS 200	2.0 litre VVT-i	Petrol	9.7	231	III	71.0	1.380	n/a	0.140	0.030	n/a

[1] *Combined Cycle (Extra urban- urban- combined) – ref. 1999/100/EC*
[2] *ref. 1999/101/EC*
[3] *EEC 70/220, as amended by Directive 2001/1/EC*
[4] *relaxed limits apply as for vehicles with maximum mass exceeding 2,500 kg*
n/a = not applicable

Purchasing and Manufacturing

Parts and components procurement is an important part of the vehicle life cycle. Toyota is committed to sharing its responsibilities with its suppliers when it comes to the type of materials used and procurement logistics.
At its manufacturing plants, Toyota is striving to cut down environmental emissions through constant improvements in technology and techniques. To reach this objective, Toyota has introduced a strict performance monitoring system and counts on the active contributions of its employees to find simple, workable solutions, based on their own experience. Toyota's new plant in France is a state-of-the-art factory, and the company's UK plants are environmental pioneers, with a long experience of environmental commitment.

Being Proactive: Environmental Purchasing Guidelines

Toyota is asking all its business partners to join it in making environmental protection a top priority. This demand becomes explicit in the European version of the Toyota Environmental Purchasing Guidelines, launched early in 2001. These guidelines explain the initial steps suppliers need to take, as Toyota's partners, to protect the environment. Toyota strongly encourages its suppliers to incorporate these guidelines into their own environmental programmes. Under the umbrella of the Toyota Earth Charter, and endorsed by top management, the Environmental Purchasing Guidelines cover the following items:

Environmental Management System

Suppliers have been requested to establish an EMS and obtain either external certification in line with ISO14001 or EMAS standards by the end of 2003.

Chemical Ban List/ Environmental Data Sheets

Toyota and its suppliers should work towards eliminating the use of chemicals contained in Toyota's global chemical ban list. This is a key step in ensuring the elimination of such chemicals from manufacturing operations and from Dealers' waste.

Declaration of Material Composition

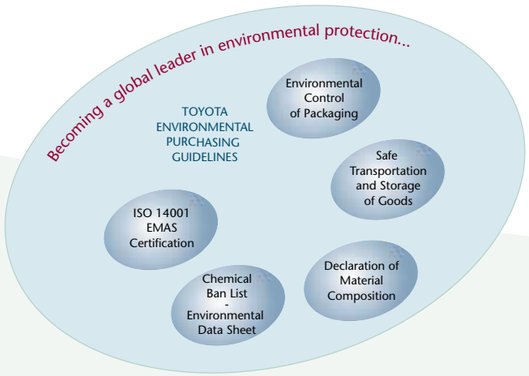
Suppliers are required to report the type of materials used in supplied parts and components. This information will enable Toyota to continue the development of future products using the most appropriate materials, and help to identify where further improvements in the design of new vehicles can be achieved.

Safe Transportation and Storage of Goods

Suppliers are required to provide material safety data sheets to ensure appropriate packaging, marking and labelling in accordance with regulations; establish a hazardous material transportation management system; and provide training to everyone involved in the handling of hazardous materials.

Environmental Control of Packaging

Toyota in Europe strongly recommends that suppliers use returnable packaging for parts and components; supply goods in returnable or recyclable packaging for all raw materials, car accessories and service parts.



Manufacturing in the New Millennium

In France: a Green, Clean & Lean Factory for the 21st Century

In January 2001 Toyota Motor Manufacturing France (TMMF) began production at Toyota's second passenger car plant in Europe. The new plant manufactures Yaris compact cars for all European markets. By June 2001, 1600 people worked at the factory which aims to hire a total of 2,100 members by 2002. Annual production capacity is forecast to reach up to 180,000 units during 2003.
The TMMF plant has been designed using the concept of a "Green, Clean & Lean Factory". This means, at its core is the objective of reaching the highest possible levels of environmental protection within Europe. The plant has been designed for maximum efficiency and equipped with state-of-the-art technology.
This high level of environmental activity is being achieved through environmental performance, measured using four main indicators: VOC (Volatile Organic Compounds) emissions, water consumption, waste generation and energy usage.
Since production began, TMMF's management has taken the measures necessary to reach environmental excellence, putting in place an environmental management system that will shortly obtain ISO14001 certification.

Efficient Energy Use

The site has been designed on a "lean" concept: the plant size and design have been created with the aim of optimising energy consumption (heating, electricity etc…). A relatively "small" building (only 110,000 m^2) has been used, along with several other innovations that have been put in place. These include :
> Use of a hot water boiler instead of a steam boiler
> Total heat exchange for the booth air conditioning systems
> Regular consumption survey; process and utilities supply networks are separated

Minimisation Of Water Consumption

To minimise water consumption and avoid water pollution, several innovative measures have been introduced since the plant commenced operations:
> Moisture sanding process - a low water usage process for paint repair
> Small scale shower test, working in closed circuit
> Recycling capability of in-house treated waste water for the cooling tower systems

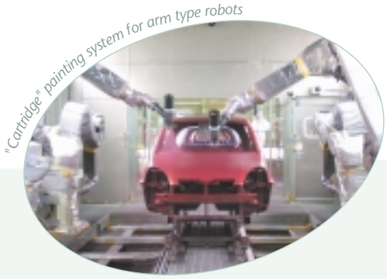
Working Towards Zero Waste

Traditionally, vehicle manufacturing generates a variety of waste types. In the Assembly Shop, 98% of the parts assembled on the car body come from external suppliers.
These parts represent thousands of deliveries and potentially many different types of packaging, which are all a source of waste. In order to achieve its objective of zero waste to landfill, TMMF has implemented, from the early stage of the project, a 5 R programme (Refine, Reduce, Re-use, Recycle & Retrieve energy). This includes measures such as :
> The selective sorting of all waste for re-use or recycling
> The use of returnable and recyclable packaging for parts delivery
> In-house re-use of plastic bumper TSOP resin (Toyota Super Olefin Polymer) by the shredder

Low VOC Emissions

In passenger car plants, the paint application process is the main source of VOC emissions. In order to reduce these emissions, the best available technologies have been put in place since production began:
> Introduction of a "cartridge" painting system in order to reduce the use of solvents for arm type robots
> Introduction of a voltage block bell system to increase paint transfer efficiency
> In-house VOC incineration for the body paint oven and for the bumper paint booth.

Returnable and recyclable packaging


"Cartridge" painting system for arm type robots

Purchasing and Manufacturing

The UK: Toyota's Manufacturing Pioneer in Europe

Company History

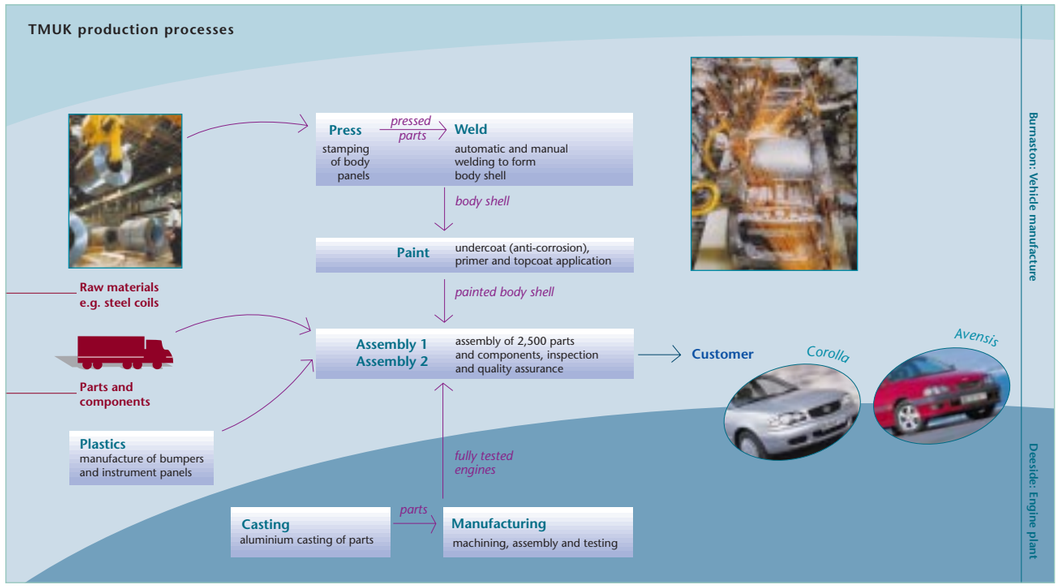
TMUK was established in 1989 as part of a global company plan to localise production in Europe. Two sites were built: a vehicle manufacturing plant at Burnaston near Derby in the Midlands; and an engine plant at Deeside, North Wales.

The first car, a Carina E, drove off the production line in December 1992. Since then the company has expanded, through the commitment and hard work of TMUK's employees and further investment. TMUK now produces both the Avensis and the best selling Corolla at Burnaston.

At Deeside, TMUK have added an aluminium casting plant and expanded the range of engines both for Burnaston and for Toyota's new, state-of-the-art French plant at Valenciennes, where the Yaris is produced.

Recently, ambitious expansion plans were announced for Deeside. These included:

> Production of the 2.0 litre common rail diesel engines in 2003
> Export of petrol engine components to other Toyota plants in South America and South Africa
> Export of engine components to Toyota's other European plants for local assembly



Plant Profiles	Vehicle Manufacturing	Engine Manufacturing
Location	Burnaston, Derbyshire	Deeside, North Wales
Total Investment	£ 1.1 billion (e[2] 1.9 billion)	£ 400 million (e 680 million)
Products	Avensis 4-door/5-door/estate Corolla 5-door liftback	VVTi engines: - 1.4 litre ZZ engine - 1.6 litre ZZ engine - 1.8 litre ZZ engine
Production volume - year 2000	170,000 vehicles	130,000 engines
Employment (January 2001)	2,491	338

[2] *Exchange rate £ 0.59 = e 1*

Improving Environmental Performance

Toyota's philosophy is to reduce environmental impacts and eliminate all types of waste produced during the manufacturing process.

At TMUK the core environmental performance indicators (EPIs) used to manage the environmental aspects and to track performance are:

> Energy used per car/engine built
> VOCs (Volatile Organic Compounds) emitted to air per square meter of car coated
> Waste water generated per car/engine built
> Waste materials generated per car/engine built
> Waste generated that is disposed to landfill per car/engine built

Environmental performance improvement is integral to TMUK's business plan and is considered fundamental to the success of the company. Each production area agrees improvement targets and produces a reduction plan, detailing how these targets will be achieved. Cumulatively, this ensures that company targets are met.

>> test track

The progress against the reduction plans and the actual environmental performance of each area are tracked, using the performance indicators described above. In this way, the improvement in environmental performance can be tightly monitored and reported back to the company directors and each production area. To further enhance the effectiveness of EPIs, more rapid feedback of performance is being planned, for example by introducing weekly reporting for solvent emissions and main waste streams.

Environmental Action Plan 1998 – 2000

Having achieved certification to ISO14001 standards in 1996, TMUK set performance targets for the period 1998 to 2000, with the aim of reducing the main environmental impacts from the manufacturing operation. In order to set 3-year targets, predictions were made on future performance, using 1997 data as a baseline. Production volume and predicted values without improvements, and other information, were considered and areas for improvement investigated. These targets and their status are summarised below. Progress towards meeting each of the targets is reported in the following sections dealing with specific environmental impacts.

TMUK Objective	TMUK Target by end 2000	Status
> Reduce energy consumption	> Total energy: 31% from 2795kWh/car to 1925kWh/car at Burnaston > Electricity: 11% from 161kWh/engine to 144kWh/engine at Deeside	a a
> Improve waste water management	> Reduce waste water volume by 10% at Burnaston from 4.65m³/car to 4.19m³/car	a
> Minimise waste production processes and packaging	> Reduce waste* by 27% at Burnaston to 20 kg/car (base year 1995) > Standardise waste tracking at Deeside > Achieve 56% recovery and recycling rate for total packaging by the end of 2000 company-wide	a a a
> Plan compliance with future VOC regulations	> Reduce emissions at Burnaston by 5 g/m² from 58 g/m² (predicted value without improvements) to 53 g/m²	a

* *This excludes recycled waste for which revenue is gained*
a *Target achieved by end 2000*

Purchasing and Manufacturing

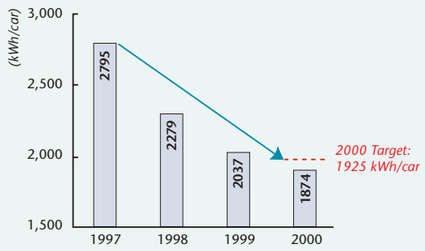
Energy Management

Energy consumption (fuels and electricity) is related to emissions of CO_2, and other greenhouse gases, created during fuel burning on site or during electricity generation from the electricity supply chain. Emissions of greenhouse gases contribute to global warming and climate change. At both the Burnaston and Deeside sites, electricity is supplied from the national grid. In addition, both sites have diesel generators for use during emergencies or peak periods. Both sites have compressors so that compressed air can be supplied to the shops for the operation of pneumatic equipment. Burnaston also has a boiler house utilising natural gas or diesel. Steam from boilers is used for heating the paint booths in the paint and plastics shops.

EPI: the amount of energy used at TMUK is tracked and measured on a per car or engine basis.

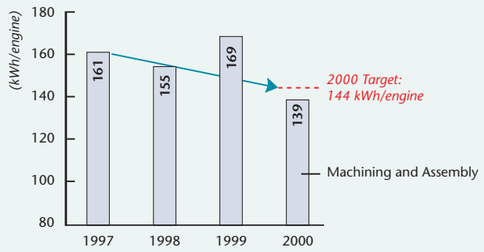
> Since 1997, when the second model was introduced at Burnaston, the energy usage per car built has steadily decreased. The average result during 2000 at Burnaston was 1874kWh/car, achieving the energy reduction target of 1925kWh/car.
> An example of more efficient energy use: auxiliary compressors around site are now integrated into the site compressed air system, so that as appropriate, smaller local compressors are used instead of the large central compressors.
> Total reduction since 1997 has been 33%.

Energy use (gas and electricity) at Burnaston



> The average amount of electricity used per engine produced at Deeside during 2000 (machining and assembly) was 139kWh, 3% below the target set of 144kWh. Gas usage is low on site, and was therefore not included in the original target.
> The new casting plant began operations during 2000, and data will be reported from next year.
> A major focus has been to improve energy efficiency by fitting inverters to equipment such as pumps and fans.
> Total reduction in electricity usage since 1997 (excluding new casting plant) has been 14%.

Energy use (electricity) at Deeside



Energy tracking in real time

TMUK has made major improvements to the energy tracking on site over the last 18 months by introducing and developing the SCADA (Supervisory Control And Data Acquisition) system. This is a centralised system which monitors the utility performance around site on a real-time basis. There is access to the system in each production shop, allowing staff to view the shop's electricity, compressed air, gas, water and steam usage. Each shop has an overall energy target, and additional targets for set time periods during the day. A major focus during the last year has been the reduction of energy during non-production hours. Weekly reports for each 30 minute time period are given to team members with responsibility for energy and the shop Manager. An energy committee is held once a month, during which the departments report on the shops' energy use and improvement activities.

Checking the waste water treatment plant efficiency

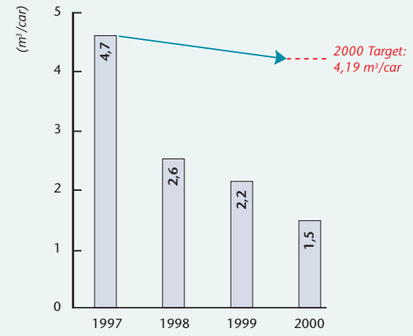
Managing Water

Water is supplied to TMUK in an efficient manner that uses inverter controls on the pump motors. The inverters ensure that the water is supplied at a constant pressure as demand varies, ensuring both energy efficiency and that there is no excess water supply. Industrial water usage is metered for each shop, and targets are set annually for water usage reduction in each shop. The shops examine production processes that use water and seek to improve the efficiency of those processes.

EPI: Waste water volume is calculated on a per car basis (m^3 per car) and per engine basis (m^3 per engine)

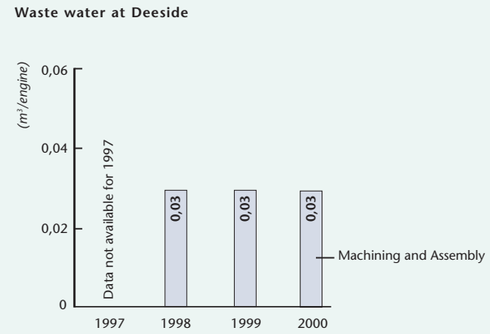
> There has been a major focus on reducing waste water at Burnaston. Levels have been reduced to 1.5m^3/car, beating the action plan target of 4.19m^3/car by 64%.
> The development of the SCADA system in house has been of major benefit to water management. The system cost approximately £ 30,000 (€ 50,800) to install, but would be substantially more than this to replace, due to the huge amount of in-house development which has subsequently taken place. The system enables the shops to view their water consumption at any time, in real time.

Waste water at Burnaston



> At Deeside, the wastewater produced increased from 0.03 to 0.06m^3/engine during 2000, due to the start up of the casting plant and a new engine line.
> A major focus has been to reduce the water used in the seven large central coolant systems used for cutting operations. Each system now uses approximately 160,000 litres of water (previous use was 200,000 litres), making significant savings each time the systems are renewed. Washing machine waste (from washing engine components) has also been reduced by 50% by changing the cleaning methods used from steam to foam.
> The new casting plant began operations during 2000, and data will be reported from next year.

Waste water at Deeside



Specific improvement actions to reduce water usage

> Slurry tanks are now aerated to reduce sludge settlement, reducing the amount of cleaning water required. The water usage in the paint sludge ponds – where the water from the painting process is treated- has been reduced, by optimising the chemical dosing regime.
> The SCADA system has enabled leaks to be identified and repairs to be carried out more quickly.
> Adjustments to the shower tester for the finished vehicle have ensured that water loss through evaporation is minimised.
> The volume of water required to operate the wet sanding process in the paint shop was significantly reduced.

Ensuring waste water quality

The used industrial water from TMUK is analysed at the onsite waste water treatment plants to guarantee the correct water treatment. The system is controlled to minimise the use of treatment chemicals and maximise the quality of the water. After treatment, the used industrial water returns to the sewerage system. Samples of the treated water are taken routinely (once a day) to ensure the water quality. Internal control limits for various parameters ensuring good water quality (e.g. for pH, heavy metals etc) are set below legal emissions limits.

Purchasing and Manufacturing

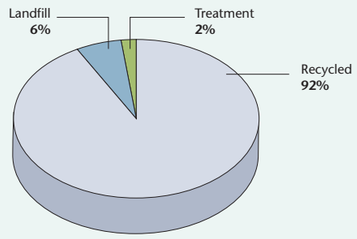
Waste Minimisation

Toyota promotes the reduction of waste and recycling of resources through the 5R programme, which covers all aspects of the vehicle life cycle. The goal of the programme is to completely eliminate waste. At TMUK efforts are continually being made to drive down the level of waste that is produced, either by reducing it at source, by segregating it to enable recycling, or by re-using waste where possible.

The main focus for waste management at TMUK has been on waste that is not currently recycled or reused.

EPI: The performance indicator used is the waste produced per car (excluding recycled waste for which revenue is gained). Since the main impacts of waste are on resource utilisation and landfill, the amount produced per car that is disposed to landfill is also tracked.

Total waste for Burnaston %



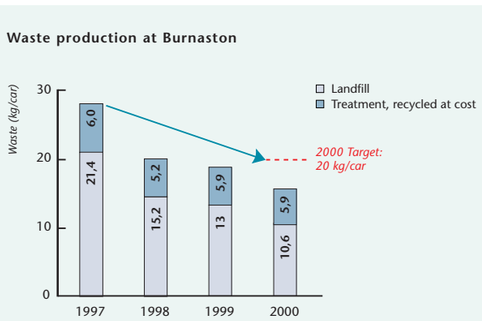
> During 2000, 92% of the total waste produced during the manufacturing process at Burnaston was recycled. The remaining 8% was either disposed to landfill or treated off-site

> Examples of waste produced:
Steel, aluminium, cardboard - recycled for revenue
Waste solvent, wood - recycled at cost
General waste, paint sludge – landfilled
Paint sludge pond cleaning effluent - treated off-site

> The 1998-2000 action plan target was to reduce waste (excluding recycled waste for which a revenue is gained) by 27% at Burnaston to 20 kg/car. In fact in 2000 alone, waste was reduced by 13% to 16.5 kg/car compared to the previous year, an even better result than predicted.

> There was also an 18% reduction to 10.6 kg/car in the amount of waste that went to landfill, due to improved segregation and recycling of waste.

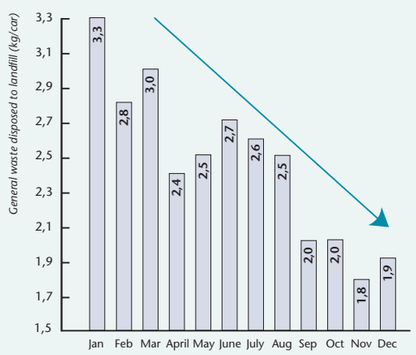
Waste production at Burnaston



> The single largest waste source to landfill is general waste, which was a major focus for 2000. General waste is non-hazardous solid waste such as floor sweepings. A major recycling drive was launched in the Avensis assembly shop during 2000. This consisted of a detailed analysis of the general waste, introducing extra recycling stations for improved segregation, member training and the recycling, or re-use, of several small parts previously regarded as waste. The key to the success of the project was the involvement and motivation of the team members.

> The results showed that a total reduction of 1.4kg general waste per car was achieved (42%).

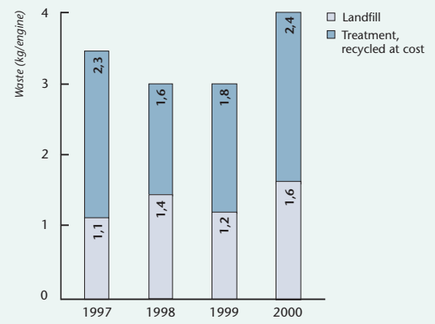
General waste reduction trend
Avensis assembly shop (year 2000)



> The start-up of the new casting plant at Deeside in 2000 has resulted in a number of new types of waste. Recycling options have already been identified and implemented for all the major new wastes such as casting sand, scrap aluminium and dross. Waste data for the casting plant will be included in the environmental report from next year onwards.

> For the engine plant machining and assembly processes, waste increased during 2000 due to the introduction of a new engine line and increased maintenance. Although there were no specific 3-year performance targets for the engine plant, a lineside waste segregation and recycling system was implemented to reduce the quantity of waste disposed to landfill. This resulted in a reduction in waste of 38% from April to December 2000.

Waste production at Deeside



Waste facts for 2000

> 21,800 tonnes of steel off-cuts were taken for recycling during 2000. The larger pieces called 'blanks' are reused to make small parts/components.

> Metal spatter produced during the welding process is now collected. This is recycled to produce more steel.

> All scrap bumper material is recycled and the Avensis bumpers themselves contain up to 10% recycled material.

> A reduction in paint sludge waste and waste water treatment "filter cake" have been achieved by increasing the paint transfer efficiency and improving the pumps and filtration systems respectively.

According to UK Packaging Waste Regulations, TMUK's target for packaging recovery and recycling, based on the amount of packaging handled the previous year, was 52%. For TMUK, on the basis of 1999 figures, the 2000 mandatory target equates to a total of 734 tonnes. TMUK's action plan set a target for packaging to achieve the legal target. The actual total amount of packaging that was recycled during 2000 (at Burnaston and Deeside) was 2,759 tonnes. This result shows that the legal requirement for recycling steel, wood, cardboard and plastic packaging waste was met.

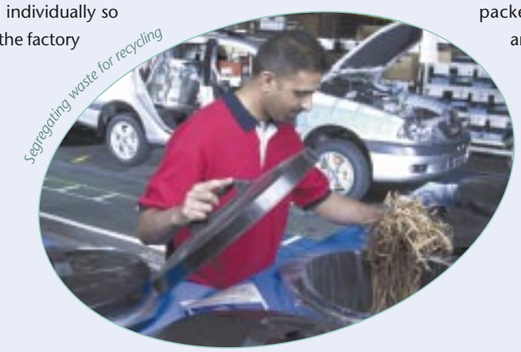
Specific improvement measures to reduce packaging and packaging waste:

> The introduction of 100% returnable packaging for European-sourced parts and components.

> The reduction in non-returnable packaging for small parts from Japan – cardboard packaging has been replaced with reusable plastic boxes.

> Minimisation of the packaging of service parts – which are generally packaged individually so that they can be sent on from the factory to the customer without being repackaged. Using ideas generated by team members and working with suppliers of the parts, improvements were made to reduce box sizes and dunnage (packaging inside the box to protect the part), replace cardboard boxes with polythene bags, or even remove packaging altogether.

> The introduction of returnable shipping for service parts - once individually packed, the parts are packed in larger cardboard boxes and placed on wooden pallets for transport. To reduce this outer packaging, returnable, stackable lids and bases for the boxes are being introduced, removing the need for wooden pallets.



Segregating waste for recycling

Purchasing and Manufacturing

Controlling Organic Solvents

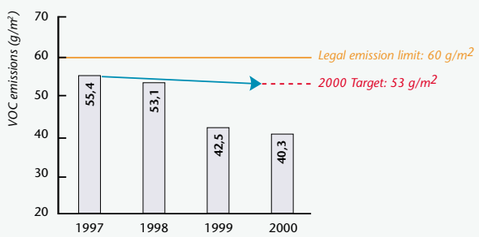
Volatile Organic Compounds (VOCs) are released into the air when organic solvents evaporate. Solvents are a constituent of many paints and adhesives used in vehicle manufacturing. Some VOCs may cause ground level ozone to form, contributing to the creation of smog and can also contribute to the greenhouse effect. Processes using VOCs at TMUK are licensed and internal targets are set below legal emissions limits to reduce the environmental impact of these processes.

The vehicle coating process at Burnaston, during which the car and certain parts such as bumpers are painted, is the main source of VOC emissions at TMUK. There are no coating processes at Deeside emitting VOC at levels which require regulation, and no chlorinated solvents (ozone depleting substances) are used in production processes at either site.

EPI: Emissions are calculated in terms of mass of VOCs emitted to the air per square meter of car painted.

> Legal emissions limits for this process are 60g/m^2.
> VOC emissions have reduced substantially over the last 4 years from 55 to 40g/m^2, meeting our target of 53g/m^2.
> TMUK was the first overseas Toyota plant to use water based base coats with a reduced solvent content. Paint is applied electrostatically. This means that the paint is attracted to the body shell, which reduces paint overspray and therefore emissions. When the paint is hardened in the ovens, the oven emissions are incinerated. This process destroys 99% of the VOCs evaporated.

VOC emissions from the vehicle and parts coating processes at Burnaston



Specific improvement actions to control VOCs

> The transfer efficiency of the robots has also been improved in the paint shop by reprogramming them to follow the shape of the car body more closely. This means that more of the paint that is sprayed reaches the car, and less is wasted.
> The hoses carrying the paint have been reduced in length and diameter, so that less paint is wasted when the hose is flushed during a colour change.
> The use of solvent for equipment cleaning has also been reduced, by introducing standardised methods for cleaning and training members to those standards.
> Solvent is also recovered for re-use, where possible, during cleaning operations.
> Wrap guard has been introduced to eliminate VOC emissions from the assembly shops. Wrap guard is a self-adhesive sheet that is applied to the exterior of the finished car in order to protect the car during transport. Previously, a solvent based wax was sprayed onto the car, which led to emissions of VOC.


Paint curing

Pursuing continuous Legal Compliance and Pollution Prevention through Monitoring

A clean record

TMUK complied with the requirements of the relevant authorisations and consents relating to the environmental aspects of its operations throughout 2000 and received no prosecutions or penalties for non-compliance with environmental legislation.

Emissions monitoring

Air

At Toyota, there is an annual emissions monitoring plan. An independent consultant is contracted to perform the monitoring, to ensure that all processes are functioning correctly and that no emission limits are exceeded. The results of the monitoring are reported to the Regulatory Authorities. In addition, TMUK has a proactive approach and continuously monitors the key processes. One example is the level of carbon monoxide emitted from the VOC incinerators on site; furthermore smoke monitors attached to the boilers ensure that any process problems are instantly highlighted.

Although not a legal requirement, air quality monitoring has always been undertaken at the site boundary at Burnaston. Initially, starting in 1991 (one year before production commenced), this was done by a state of the art system that continually analysed the gases along the site boundaries by infra-red analysis. The data confirmed that there was no impact on local air quality from production, and now the local air quality is being confirmed using diffusion tube analysis (bringing the analytical technique in line with local authority air quality monitoring).

Surface water

Two lakes were created at Burnaston before the start of production, to prevent flooding from surface water run off. Surface water from the site drains into the lakes before joining Willington Brook. To check for any contamination of the surface-water leaving site, samples are taken and analysed from the lakes and brook. Oil interceptors at the dispatch yard and car parks ensure that surface water can be prevented from leaving site in the event of contamination being detected in the samples or a spillage.

Odours

To ensure that nuisance odours are not present at the site boundary as a result of the manufacturing operation, many measures are taken. For example, incinerators are installed to destroy 99% of the VOCs evaporated during the paint curing process; at Deeside, a scrubber has been installed to prevent the release of odours from the casting plant. Prevention of odours from any new process is considered before the start of production. Checks are done at the site boundary daily. Any concerns are immediately investigated. There were no odour complaints from local residents during 2000.

Noise

As the Burnaston plant is situated close to some residential areas, TMUK contracts an independent consultant to undertake noise monitoring at the site boundary on an annual basis. At the time of monitoring, noise from the manufacturing operations was not discernible at the site boundary.

On one occasion during 2000, however TMUK did receive a complaint from a resident in a neighbouring village. The source of the noise was rectified immediately. The resident confirmed that there was no further concern.

Surface water lake at TMUK Burnaston

Logistics, Marketing, Sales and After Sales

An Effort to Improve Logistics

In Europe Toyota has put in place a global logistics network. This network covers the distribution of new vehicles to NMSCs and Dealers (from Japanese or European manufacturing plants) and service parts distribution from Toyota plants and suppliers. The network relies on road, rail and shipping and also extends overseas, mainly to USA and Japan. Other long distance transport is based on air freight.

In planning its logistics operations, Toyota's main objective is to further improve the level of service provided to Dealers and customers, while safeguarding the environment and reducing overall logistics costs.
Toyota has been planning a "re-styling" of its entire European logistics operations since 1998. The core concepts of this "re-styling" are based around the streamlining of operations and optimisation of the number of hubs and transport facilities.
Whilst improving its logistics operations, Toyota's environmental considerations have focused on energy consumption and pollution caused by transport, and waste caused by packaging and wrapping.

Logistics for New Vehicles

The function of vehicle hubs - known technically as Vehicle Logistic Centres – is to distribute cars received from manufacturing plants. Toyota's European hubs for which TMME is responsible are located in Grimsby and Derby in Britain, and Zeebrugge in Belgium. Another main hub, operated by Toyota Logistics Services France (TLSFR), a TMME subsidiary, is located in Valenciennes, France, just adjacent to the manufacturing plant. Zeebrugge and Valenciennes have been operating since early 2001.

Several European NMSCs rely on local port facilities, where vehicles are delivered from main hubs or directly from production plants, an example of which is Toyota Germany's use of the port of Bremerhaven.
The steady increase of Toyota's market share in Europe, and the establishment of a new production plant, have added pressure for the need to develop an intelligent and environmentally sustainable vehicle transport system.

Optimising Vehicles Shipment

The implementation phase for the "re-styling" of vehicle logistics began early in 2001.
As a first step, TMME took over logistics operations for Belgium, the Netherlands and France. Zeebrugge and Valenciennes, located 130 km apart, were connected by a shuttle which makes use of return journeys. Vehicles are loaded at Valenciennes hub and UK and Japanese imports are loaded on the return trips. TMME is making great efforts to guarantee that trips in both directions carry full loads.
Rail transport is always given preference over road whenever technically and economically feasible. However, damage to vehicles during rail transport is still a deterrent. Nevertheless, Switzerland, Austria, Hungary and the Czech Republic have been supplied by rail from Bremerhaven for some time. The new Valenciennes hub is also introducing rail transport progressively for use in the long-distance transport of Yaris cars to Central and Southern Europe.

Environmental Packaging for Vehicles

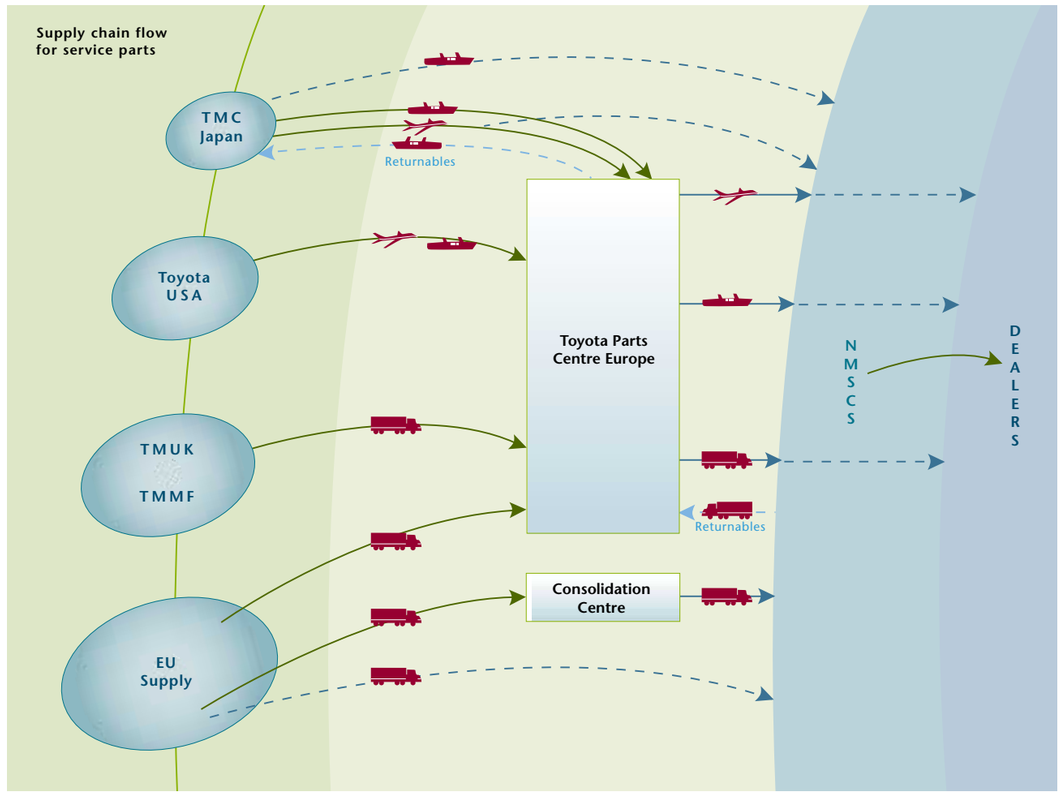
In order to protect cars during transport from the manufacturing plant, wrap guard, a self-adhesive sheet, is currently applied to the exterior of new cars. Previously, a solvent based wax, containing 43% aliphatic hydrocarbon solvents, was applied to the car. This substitution led both to reduction of VOC emissions in the manufacturing plant assembly shop, and to elimination of waste water from washing, prior to delivery. Furthermore, the wax was sprayed onto the vehicle, whereas plastic wrap guard is now manually applied.

Logistics for Service Parts

At present, Toyota's European suppliers, along with its facilities around the world, generally deliver service parts and accessories to Toyota Parts Centre Europe (TPCE) in Diest, Belgium. Here, service parts and accessories can be stocked, repacked if necessary and then delivered to NMSCs local logistics centres (warehouses) or Dealers in Belgium and France. In the case of large volume shipments, service parts are delivered directly to NMSCs. A new regional parts centre, owned by Toyota Logistics Services France, has been established at Le Pouzin and began operations in October 2001. This centre was part of the "re-styling" of Toyota's entire logistics system in Europe, and its location has been chosen to address both increased sales in Southern Europe, and the beginning of operations at the new plant in France.

Packaging Reductions in Parts Logistics

More than 42,000 tons of service parts were handled by TPCE for the European network in 2000.
Service parts, as well as accessories and large body parts, involve huge quantities of packaging, and consequently packaging waste. In compliance with the EU Waste Packaging Directive, a detailed inventory of packaging is made by TPCE and all the other logistics centres. Based on this data, numerous packaging reduction measures have been taken.



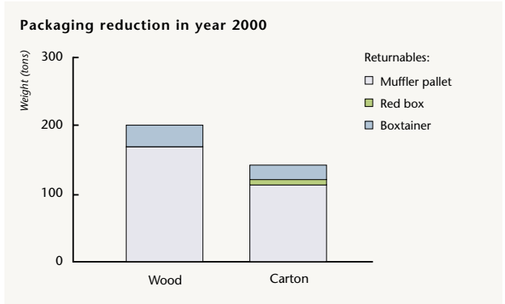
Logistics, Marketing, Sales and After Sales

Enhancing Use of "Returnables" for Parts Shipping

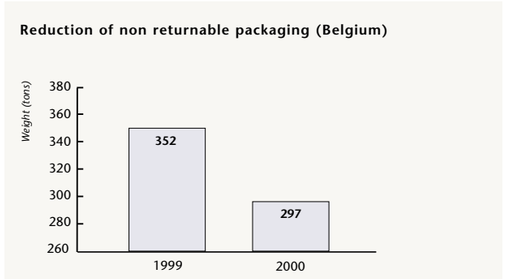
Following a cost benefits analysis and environmental impacts reduction exercise, TPCE has introduced returnable packaging containers for shipping. In order to be effective, however, these measures required the support of the main suppliers of service parts and accessories, all of whom participated in this initiative. Returnable packaging in the form of metal pallets have been used since 1997; in the following years box containers and red boxes have been introduced. In 2000, special pallets for mufflers and glass are being used. These have replaced wood and cardboard packaging, that would have created packaging waste. Returnable packaging is in use for transfers from Japan to Europe, to and from European manufacturing plants/suppliers and parts centres, and to and from TPCE and some NMSCs.

In a step by step process, the introduction of returnable packaging to and from NMSCs began in Germany and Belgium, and has been extended to France, Denmark, the Netherlands, UK, Switzerland, Austria, Italy, Spain and Portugal.

In 2000, returnable boxes have been used between TPCE and ten NMSCs. For those countries, the estimated total reductions achieved in the use of cardboard and wood are shown hereafter.



The Belgian case illustrates the actual packaging reductions attained by the use of returnable packaging.



	Year 1999	Year 2000
Non returnable packaging (suppliers parts, accessories, large body parts), in tons	352	297
Parts supplied (service parts, accessories), in tons	1,369	1,447

Reducing Packaging and Wrapping Materials for Service Parts and Accessories

Toyota is striving to reduce packaging and wrapping materials for service parts and accessories at source - initially at all its production plants. A good example is the packaging for spare bumpers which has been tailored to fit the exact shape of the part. Bumpers used to come in '"C-shaped" packaging, and could only be packed face-up, with the next pack on top needing to be face-down (slightly offset). Now the packaging has been modified so that the bumpers "nest" one on top of the other, all facing the same way up.

Promoting Environmental Awareness in Sales, Marketing and After Sales Services

Toyota is keen to establish itself as a leading environmental company, and has set itself the goal of enhancing its environmental corporate image throughout its Dealer network.

Assuring Consistency in Environmental Standards

Dealerships may have several areas of operation, such as sales areas, workshops, body shops, parts supplies and forecourts. These operations are a source of potential environmental impact. For example:

> Waste from vehicle repair and maintenance, body repair shops and paint booths
> Packaging waste from parts & accessories
> Emissions of solvents, CO_2 and exhaust fumes
> Effluents such as waste water from vehicle wash installations and tool cleaning, oils and grease

These aspects are regulated by international, national or local regulations. A common legislative framework for EU Member States is set by European Directives. However, discrepancies exist concerning the implementation and the levels of enforcement adopted by Member States. This also affects the level of compliance required by Toyota. In addition to encouraging Dealers to comply with environmental legislation, Toyota strives to assure that Dealers' environmental standards and equipment are consistent throughout Europe, and make use of the best available technologies. For example, since 1998, through its Dealer network, Toyota has promoted the adoption of a collection/ recycling kit for HFC134a and old R12, used for air-conditioner refrigerant in cars. To set up common environmental standards, in line with company's overall strategy, Toyota has issued Environmental Guidelines.

Environmental Guidelines

In early 2001, Toyota published Environmental Guidelines for NMSCs. The expectations placed on the NMSCs include an environmental approach to sales and service activities, the collection of environmental information on national trends, environmental education and public relations activities. For Dealers, Toyota has defined a list of mandatory requirements which have been set out in detail in the "Dealer Environmental Guidelines in Service Area". Based on these guidelines, NMSCs have been requested to issue national guidelines that reflect local obligations and allow Dealers to meet their responsibilities in a cost-effective manner. As these guidelines have only been issued recently, it is still too soon to report any results. Several NMSCs, such as those in France, Great Britain and Sweden, are rolling out environmental audit programmes at Dealer service areas that follow up on implementation of Dealer Environmental Guidelines and ensure corrective actions are completed.

Recycling of Waste by Dealers

The Environmental Guidelines set out specific requirements that relate to recycling activities at Dealer service areas. All Dealers must implement a waste management system, taking into account all local regulations and compliance conditions. Through this, Toyota in Europe has been actively participating in promoting the development of comprehensive Dealer waste management systems. In several European markets, NMSCs are already operating nation-wide systems for the management of Dealers waste through agreements with selected partners. These partners are responsible for the management of Dealer service area waste, from collection to sorting and treatment.

An example of this can be found at Toyota Germany which has set up a Total Waste Management System for "take-back" and recycling/disposal of all its parts and accessories packaging, as well as a number of used parts and chemicals which it supplies for vehicle repair. Toyota Portugal participates in the "Ecoauto" scheme, a National Workshop Wastes Management Scheme launched by the ACAP (Portuguese Automobile Importers Association).

Remanufactured parts

In terms of product development, Toyota is actively pursuing an environmentally friendly policy, through the expansion of its genuine remanufactured parts range. These products reuse many components, thereby eliminating the requirement for new raw materials and saving the energy needed to turn these materials into the finished product. It is expected that over the next three years, Toyota will introduce between 10 and 15 new remanufactured product ranges, all products of which are available from all Toyota Dealers in Europe.

Toyota GB - A Long standing Environmental Commitment

Toyota (GB) PLC (TGB) is the importer and distributor for Toyota and Lexus vehicles in the UK. Sales, marketing, after sales and customer satisfaction activities are managed throughout England, Wales, Scotland and Northern Ireland by a network of 214 Toyota and 56 dedicated Lexus sales centres. Just under 100,000 of our cars are sold in the UK each year giving us a market share of approximately 4%. TGB is the largest Toyota NMSC in terms of the volume of units sold annually.

Environmental Strategy

Over a number of years, TGB has developed a comprehensive environmental strategy. This has been applied internally to strengthen employee awareness of environmental issues - and to ensure environmental considerations are applied in all areas of the company's activities. Externally we promote the image of Toyota as a proactive company, responsive to stakeholder concerns.

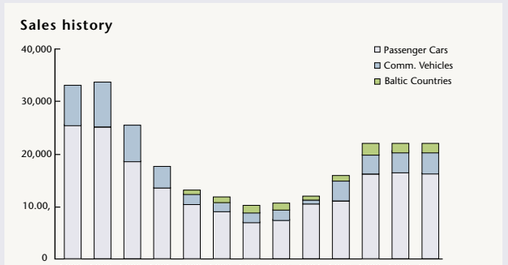
To ensure our Dealer network upholds Toyota's reputation in this area, we have developed the Toyota Environmental Service. Launched two years ago this service promotes environmental best practice through a Dealer Environmental Guide, telephone hotline and approved waste management suppliers. In addition TGB has rolled out a comprehensive free-of-charge environmental audit programme to the entire Toyota and Lexus Dealer & Bodyshop network. This amounts to nearly 400 audits, carried out within a twelve month period.

Ecospace Concept

To further emphasise the importance Dealers should attach to environmental concerns, and to assist Dealers in guaranteeing that they uphold a high standard of environmental care, our 'Ecospace Concept' was launched for both the Lexus and Toyota brands. Ecospace is a dedicated, fully bounded, secure hazardous waste storage area, which has been specified to take account of all health, safety and environmental issues with regard to the storage of hazardous automotive wastes. The unit is designed to minimise the chances of spillage and any resulting pollution that may be caused by such an incident. The unit also ensures that unsightly waste is removed from view, improving the overall appearance of the dealership. To ensure a fresh, consistent and attractive appearance to all retail sites is part of an European Programme, of which the Ecospace will form an integral part, as a best-practice waste solution.

Toyota Finland – Environmental Management of a Large Fleet

Toyota Auto Finland (TAF), part of Toyota Motor Finland OY, is Toyota's National Marketing and Sales Company in Finland, with a network of 45 Dealers and 190 service outlets. Throughout the 1980's and 90's, Toyota has been the best selling brand in Finland, and in 2000, was the number one for passenger car sales, with more than 15,000 units (11% market share). Commercial vehicle sales accounted for a 25% share of the market. Toyota Motor Finland also began operations in Estonia in 1993 as Toyota Baltic. During 2000 Toyota was the most popular passenger car brand in Estonia with a market share of almost 12%.



Wide-ranging Dealer Initiatives

Since 1995, we at TAF have launched environmental standards and guidelines for our Dealers, to help them manage their service area wastes properly. Common customer information procedures have also been put in place by Dealers, and PCs with Internet connections are available at every Toyota showroom, allowing customers free access to a Toyota site displaying product-related environmental information. Environmental issues are also dealt with in our Toyota Magazine, available at every showroom. In the Spring 2001, one of the main Dealers in Helsinki, Auto-Jalonen, obtained ISO14001 certification. This was the culmination of 15 months hard work. The system introduced is aimed at reducing environmental impacts through efficient maintenance, and improving customer satisfaction.

Taking Care of Ageing Vehicles

One result of being the number one car make in Finland is that we will have a huge stock of "end-of-life" (ELV) vehicles in the future. This is why we are active participants in a pilot project, begun by the Automobile Importers Association (AIA), to study different issues on the ELV recycling process. This working group is expected to release a consultation paper for national ELV legislation by the end of September 2001.

Toyota France - Highly Committed in a Growing Market

Toyota France S.A. (TFR), relies on a network of 230 Dealers throughout France. The company has its Head Office in Vaucresson, near Paris.

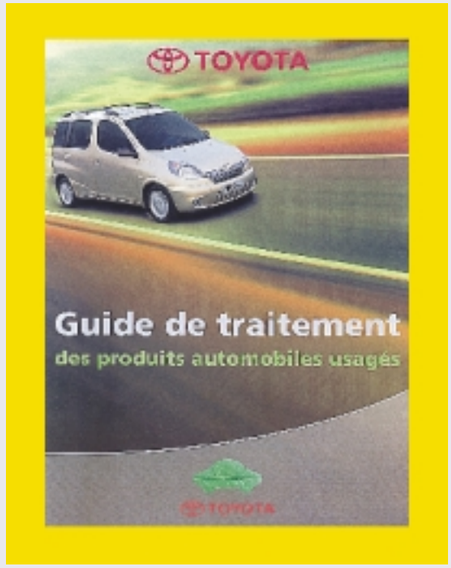
In a strong domestic French car market, Toyota has a market share of about 2%, with approximately 50,000 unit sales 2000. TFR is participating in several joint projects on environmental issues with other French and European auto manufacturers, an example of which is our involvement in the AUTOECO network. This is a recycling network for Dealer waste recovery, allowing traceability of collected waste through a web site. We use this system as a control tool for our Dealers.

Leading the environmental management system organisation within TFR is an Environmental team. The team's responsibilities include ELV and waste management. Our after sales zone managers have also been trained in environmental issues and will support environmental actions in the field with Dealers.

Engaging Dealers

In 2000, TFR developed and distributed an environmental guidebook to all Dealers.

This guide supports Dealers in the areas of waste management and promotes awareness of environmental impacts and related legal responsibilities. The guide also has details on specific requirements concerning separated waste collection by waste companies co-operating with TFR.



Waste Management

For each type of waste, our "Dealer Environmental Guidebook", describes the risk factors, proper storage conditions, recovery and best practices for treatment. As Toyota France also wants to develop the practice of sorting waste at Dealers, several common tools are recommended, such as waste collection containers and labelling. The Guide also lists recognised waste recovery and recycling companies, offering their services to Dealers under the conditions agreed within the scope of AUTOECO. To support the efforts of our Dealers, and to raise the environmental awareness of our customers, TFR prepared a "Free oil and battery recovery" poster. This can be found at all French Dealers. To assess the implementation effectiveness of the waste collection system, a survey of the collection company was carried out through the AUTOECO website. The system now covers approximately 48% of all Toyota Dealers' hazardous waste collection. Using the survey data collected through the web site, we were able to estimate the total quantities of hazardous waste collected and treated (period: January-May 2001):

> Oil filters: 17,500 units
> Cooling liquids: 35,000 litres
> Batteries: 3,000 units

When compared against Toyota's figures on the number of vehicles currently in use in France, this data provided a clear indicator of the system's effectiveness.

As the system is still under development, we are confident that all our Dealers will join AUTOECO and allow us to track waste collection data fully by end of year 2001.

Improvement Through Site Audits

As a further step, we want to actively help our Dealers improve their waste management. To that end, a programme of on-site environmental audits began in late 2000. The main purpose of these audits is to analyse all potential pollution sources created by Dealer's activities. We would also like to check the current status of waste management and levels of compliance with French environmental regulations. Such audits also offer an opportunity for us to meet Dealer Directors and their staff, promoting awareness and educating them on environmental protection issues. In these audits, issues such as water use and discharge, emissions, energy consumption, environmental law on installations, taxes and royalties and health & safety aspects are checked according to a standard check-list. Our TFR auditor works with the Managing Director and a dedicated staff member at each Dealership. Where necessary, the auditor explains regulations and gives advice on improvements and financial support from environmental institutions (e.g. from the Water Agency on used water treatment).

End of Life

Striving for Sustainable End-of-Life Processes

When old or seriously damaged vehicles are discarded, they become a source of waste. Between eight and nine million vehicles are discarded annually in the EU. This represents about eight to nine million tons of waste, and is a potential source of soil and groundwater contamination.

End-of-Life Vehicles (ELVs) were identified as a priority by the European Commission's priority waste streams programme, set up in the early 1990's. This brought together governmental, environmental and industrial stakeholders to build a consensus on how to address such waste.

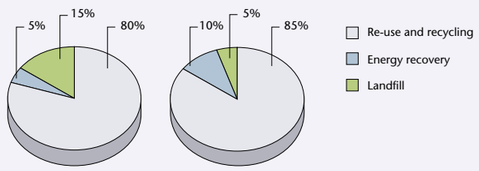
The European Commission set itself a goal to harmonise national measures concerning end-of-life vehicles. The objectives were to minimise the impact on the environment, ensure the smooth operation of the internal market and avoid unfair competition within the EU. A proposal was made by the Commission to the European Parliament and Council that lead to the "Polluter Pays Principle". After four years of discussions between politicians and the industry, the 2000/53/EC Directive on End-of-Life Vehicles was issued.

The End-of-Life Vehicles Directive

The EU ELV Directive 2000/53/EC shall be implemented in all Member States by April 2002.

The Directive lays down measures aimed at the prevention of waste arising from vehicle maintenance and at the re-use, recycling and recovery of end-of-life vehicles and their components. The Directive also promotes the improvement of the environmental performance of all of the economic operators involved in the life cycle of vehicles, and especially the operators directly involved in their treatment.

ELV Directive targets



The key aspects of the Directive are:

> The delivery of ELVs to authorised treatment facilities, free of charge to the last owner. Producers to meet all, or a significant part of the above costs (depending on certain conditions). This comes into force from July 2002 for vehicles placed on the market on that date, and from January 2007, includes all vehicles sold before July 2002.

> Specific targets are set for re-use, recycling, and recovery in order to reduce landfill. In addition, vehicles receiving type approval in 2005 need to fulfil 85% recyclability (excluding energy recovery) and 95% recoverability (including energy recovery).

> Vehicles put on the market after July 2003 cannot contain hazardous substances, such as lead (Pb), Mercury (Hg), Cadmium (Cd) and Hexavalent Chromium (Cr6+), other than foreseen in an exemption list, as an annex to the Directive.

A recent Amendment to the EU Waste Directive (Commission Decision of 16 January 2001), classifies End-of-Life vehicles, as of January 2002, as "hazardous waste", if not de-polluted.

Strengthening Recycling Research

Product design optimised for recycling is only one of the elements necessary to put ELV recycling into practice. Current recycling rates vary from country to country due to differences in the recycled/recovered materials markets, labour costs, landfill costs, and the levels of quality and professionalism in collection, at treatment facilities and in technology. This explains the necessity for matching the early stages of Design for Recycling, with current economically sustainable practices.

Toyota operates a state-of-art dry-sorting recycling facility that recycles ASR (Automobile Shredder Residue), in co-operation with Toyota Metal Co., Ltd. To further advance recycling technologies, Toyota has established an Automobile Recycling Technical Centre to research "easy-to-dismantle vehicle structures" and "appropriate and efficient dismantling technologies". This centre will provide research results for design divisions and will provide information worldwide to help dismantling, shredding and recycling companies improve recycling methods. In Europe, Toyota promotes the exchange of information and expertise between engineering development divisions and local suppliers and contractors. This exchange can encompass components suppliers, plastic and metal recycling companies, shredders and dismantlers. Toyota is working together with NMSCs and Dealers in fulfilling the requirements of the ELV Directive in individual countries.

End-of-Life Vehicle (ELV) treatment process

End of Life

Improving Recoverability: Towards Design for Recycling (DfR)

Around 75% of the average vehicle weight is currently recycled through metal recovery. The majority of the remaining automotive components, especially rubber and plastics, are still disposed of as solid waste. The main reasons for this practice are the high costs of dismantling, logistics and recycling.

In response, Toyota's engineers now consider these requirements at the earliest stages of development and are engaged in considering the best way to ensure the recovery at the end-of-life stage of the vehicle. In "Design for Recycling", recommendations are given for problems encountered during the establishment of the recycling streams.

Examples of recommendations for "Design for Recycling" are the following:

> Material selection

Engineers are striving to limit the diversity of materials used. Individual components should be manufactured from so-called pure-sorted materials. For composite systems, investigations have to be made for materials that are compatible in a joint recycling process

> Marking of plastic components

Plastic components must be marked to facilitate sorting during end-of-life recycling

> Design of components to facilitate dismantling

By improving the design Toyota ensures that operating fluids are quickly segregated and collected for subsequent recovery. Components containing harmful materials, like batteries and airbags for example, are also improved.

In order to improve recycling, other general design rules applied to the design of components are:

> Reductions in the number of fastening points

> Standardisation of fasteners used for one and the same component

> Use of quick-release fasteners

> Improvements in access to fastening points.

Active Promotion to Recycle ELVs

Several Member States have provided ELV legal frameworks (Denmark, Sweden, the Netherlands), or have some kind of Voluntary Agreement with vehicle manufacturers and importers (Germany). However, most European countries have not yet issued national regulation to fully comply with the objectives of the ELV Directive, which will introduce common standards for the whole of Europe. Toyota is actively co-operating with other car producers and importers in working groups to address the issues of the Directive, and is having open and direct discussions with manufacturers/importers associations, and with authorities in charge of setting up national legislation.

In Belgium Toyota is a promoter of the Belgian Febelauto Consortium, grouping all vehicle-related stakeholders, from auto producers to the authorities. In the UK, where Toyota has a substantial fleet, both NMSCs, and manufacturing plants are actively engaged in ACORD (Automotive Consortium on Recycling and Disposal) and CARE (Consortium for Automotive Recycling), both aiming to meet the requirements of the ELV Directive whilst protecting the interests of the industry.

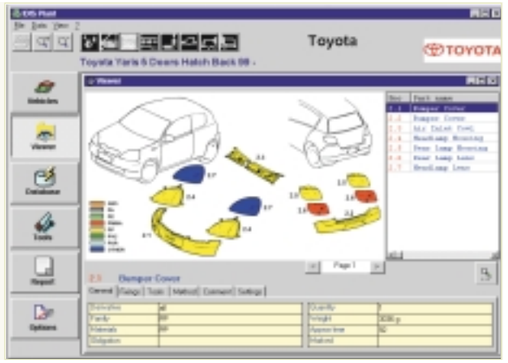
In Finland, Toyota is participating in a pilot project with the government and the industry on dismantling, in order to decide which type of dismantling infrastructure is required to handle the volume of ELVs in Finland. The current situation of vehicle dismantling and recovery is not homogenous across Europe. This is reflected in the different measures adopted by Toyota's NMSCs. For example, Toyota Germany and Toyota Sweden have used their Dealers to build up a collection network. Dealers are considered as ELV acceptance points. In the Netherlands, Toyota Netherlands is directly involved with ARN (Auto Recycling Nederland) in operating a widespread network of licensed ELV recyclers.

A practical tool for dismantling

As part of the ELV Directive, auto manufacturers must provide dismantling information for each type of new vehicle within six months of the vehicle being marketed.

In order to meet this requirement, Toyota joined a Consortium of more than 20 manufacturers which prepares dismantling information in an electronic format – the International Dismantling Information System (IDIS). This information is regularly updated and distributed to the authorised dismantling network in each Member State.

More information on the IDIS system can be found on the web site at http://www.idis2.com



Building the Prius Battery Recycling System

Final disposal of batteries is considered to be a key issue in the life cycle of electric vehicles. To make Prius the ecological car market leader in terms of battery disposal, the issue has successfully been solved by Toyota.

About Prius Batteries

The Toyota Prius Hybrid System battery is a high voltage (~280 V) NiMH (Nickel Metal Hydride) battery, weighing approximately 40kg. The battery contains 38 modules, each sealed and comprising six cells. To minimise the risk of mishandling, NMSCs ensure direct collection by specialised companies.

In all countries where Prius is sold, roadside assistance and emergency services are informed on how to handle Prius batteries in the case of a vehicle breakdown or accident.

Battery recycling in practice

Even before the European debut of Prius, Toyota established a dedicated NiMH battery recycling network. All those involved in the system - from customers, local authorities, emergency services, Dealers, to independent workshops and garages - have been informed that Toyota Prius Dealers are the central collection points for batteries.

After collection, Prius batteries are transferred to a certified Toyota recycling company. Current certified companies include: SNAM and Citron in France; Accurec in Germany; Batrec in Switzerland; Saft in Sweden. Other treatment companies can be approved by TMC upon request. A "Prius HV Battery Dismantling Manual" was developed and distributed to Prius Dealers focusing on precautions to be observed when dismantling a damaged vehicle.

Prius battery recycling system