

Everyone needs to travel

Buses and coaches are a key part of the solution to making travel more sustainable





Foreword

The impact of climate change throughout the world is one of the major issues facing every one of us in our everyday lives. There is much discussion and various views on the damage being done to the environment and the role that transport can play in reducing greenhouse gas emissions.

There is a tremendous amount of work being done to cut transport emissions in the UK. The Bus and Coach industry is committed to supporting the Government's efforts in tackling CO₂ emissions within the transport sector.

In its role as the trade association for the bus, coach and light rail industry, the Confederation of Passenger Transport UK has been working closely with the UK's five largest groups on this subject. In an effort to demonstrate and explain just what the industry is doing in this area we have created the Environment Zone at this November's largest dedicated bus and coach trade show in Europe - Euro Bus Expo 2008.

The Environment Zone has a central theme which is *how everyone needs to travel - buses and coaches are a key part of the solution to making travel more sustainable*. This show feature highlights some of the environmental challenges facing our industry, what is being done and, perhaps more importantly, the opportunities for bus and coach travel to continue to play its part in the environmental debate.

I would like to take this opportunity to thank our five supporting sponsors, Arriva, FirstGroup, Go Ahead, National Express and Stagecoach for their contributions in making this happen. My thanks to every member of the Working Group, for their time, effort and dedication to making the Environment Zone a reality.

I hope that you find this information interesting and you discover our industry is making strides to play its part in improving the world in which we live.

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How buses and coaches can help deliver more sustainable travel



Today's transport challenge

Tackling **climate change** is now widely recognised as one of today's **greatest challenges**.

Carbon dioxide **emissions** from the **surface transport** sector are **around 25%** of the UK total.

54% of UK transport sector **emissions** are from cars with **bus accounting for 3%** and train 2% (source: Defra 2007)

Carbon dioxide **emissions** from the surface transport sector **continue** to rise.

Congestion is becoming an increasingly **critical issue** in our **towns and cities**.



Making bus travel more attractive

Attracting new passengers to public transport is about looking at transport provision in a new way. The *ftr* (future in text speak) is a new concept in public travel developed by FirstGroup in close consultation with current and potential customers. It aims to deliver the high quality of a tram with the flexibility of a bus. The state-of-the-art vehicles are stylish and comfortable and have onboard Customer Service Hosts to assist speedy boarding, answer travel enquiries and issue tickets.

A real time information system tracks the location of the vehicles and gives traffic light priority to help them run on time. This technology also gives customers details of when the next *ftr* is due. First now operate *ftr* schemes in York and Leeds with a further scheme due to start operations in Swansea in Spring 2009. Since the first vehicles were introduced in York in 2006 there has been a 28% increase in patronage on the routes where they operate. Customer satisfaction is at 94%. 7% of customers use the *ftr* for journeys they previously made by car.

Reducing energy usage at depots

Energy is used for heating, lighting and use of equipment at bus depots. Over the past four years FirstGroup has had on-going initiatives to reduce energy usage from their depots. Since 2004 energy usage has reduced by 19%.

This equates to 4,537 tonnes of carbon dioxide. This has been achieved through behavioural changes, new and low cost energy reduction initiatives and investment in heating management systems. The company has recently established a contract with Opus Energy. This will involve the installation of half hourly meters at all 600 locations with the energy being derived from 100% renewable sources. These include on-shore wind, small scale hydro and biomass. The installation of smart meters will support the company in achieving further energy reductions in their buildings.

CASE STUDIES FROM  transforming travel



How buses and coaches help address this challenge

Carbon dioxide **emissions** per passenger journey from **buses** and **coaches** are around **one third** less than those of **cars**.

Around **63%** of **carbon dioxide** emissions from cars arise from journeys of less than **25miles** which can **readily** be made by bus.

Buses and coaches are the quickest and **cost effective** way to **attract** more people to **public transport**.



Go-Ahead group and the environment

Youngest and Greenest

Sustained investment means that Go-Ahead has the youngest and greenest bus fleet of the major UK operators (TAS Partnerships August 2008 - excludes regulated London operations). TAS' research finds that Oxford Bus Company has the greenest fleet in the UK

Improved efficiency

Across our bus operations we have made significant investments in driver monitoring technology and training schemes. Trials have suggested this should improve fuel efficiency by around 5%.

Go-Ahead's 17% site energy reduction
Our key achievements:

- First national transport operator to gain accreditation under the Energy Efficiency Scheme (EEAS), the UK's leading independent emission reduction award scheme
- 17% reduction in site energy usage during the period November 2006 to October 2007
- Embarked on a significant project with the Carbon Trust to further reduce our site energy
- Committed to generating 70% of our site electricity from renewable sources including hydro-power, wind-power and biomass fuels from November 2008.

CASE STUDIES FROM **Go-Ahead**



ARRIVA

First
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national express

Stagecoach



Connecting our communities

Buses and coaches play a **vital social role** helping people access **jobs, services** and other facilities.

They **provide** travel options for people who do not have **access** to a car and might otherwise be **socially excluded**.

Use of **public transport** helps reduce congestion - a **growing** problem in our cities.

Reducing congestion **improves** road safety and local **air quality**.

Many **commuters** travel by bus to work each day **supporting** a **healthy economy**.

Buses and coaches can reduce **congestion** associated with the **school run**.



Renewable energy

Stagecoach has signed a contract to source most of its electricity requirement for its UK bus operations from renewables.

Electricity generated from mostly small-scale hydro, as well as on-shore wind and biomass, will provide more than 70% of the company's required supply, with the remainder coming from cleaner, low-carbon sources. Smart meters are also being installed to help cut energy use as part of the £3.5million contract with Opus Energy. The two-year contract, which will dramatically decrease CO₂ emissions, covers electricity supply to around 240 UK sites.

Sustainable biofuel

Stagecoach is testing the UK's first Bio-buses, which run on 100% biodiesel.

The bio-fuel is manufactured by Argent Energy Ltd from used cooking oil and other food industry by-products, which are from sustainable sources that do not involve the destruction of natural habitats or compete with the human food chain. The environmental project - taking place in Kilmarnock, Scotland - also allows customers to exchange used cooking oil for discounted bus travel. Since the initiative was launched in October 2007, it has cut CO₂ emissions from the buses by 80%, saving 550 tonnes of carbon, and more than 21 tonnes of used cooking oil has been recycled.

Fuel efficient driving technology

Stagecoach has launched a six-month trial of a hi-tech in-cab driver system to improve safety, reduce fuel costs and cut carbon emissions. The initiative has been launched in partnership with GreenRoad Technologies, a leading driver safety company.

Research has found that GreenRoad Safety Center™ can reduce accident rates by more than 50% and reduce fuel costs and CO₂ emissions by an average of 7%. The system improves driver behaviour behind the wheel through an in-vehicle sensor monitoring up to 120 driving manoeuvres, such as speed, braking, acceleration, lane handling and turning. Data is sent in a continuous stream to a web server and analysed, providing information about a driver's performance. Instant feedback is given to the driver using red, amber and green lights on the dashboard and optional SMS or email messaging. Fleet managers and drivers can also access a password-protected web site to review an individual's driving skills and see recommendations for improvement. The Stagecoach trial will cover 60 vehicles and more than 100 drivers on the company's bus network in Barrow-in-Furness in Cumbria with the support of local trade union representatives.

CASE STUDIES FROM 



The environmental debate

National Express show that there are large net savings in emissions of greenhouse gases from customers using their services instead of the car or plane.

Developing initiatives to encourage individuals to take steps to reduce their own carbon foot print by taking public transport. National Express are promoting the crucial role public transport has to play in reducing the emissions of greenhouse gases with policy makers. They have been active in driving industry initiatives and responding to Government consultations and enquiries. In 2007 they played a role influencing the future development of transport through involvement with the World Wildlife Fund's "One Planet Business" personal mobility project. The majority of National Express emissions arise from the operation of their fleet of vehicles. New vehicles, which are more environmentally friendly in terms of exhaust pollutants, are less fuel efficient and so produce more greenhouse gases than the older vehicles they replace. Congestion also results in a decrease in fuel efficiency. Priority lanes and traffic management are important as they help increase efficiency and grow patronage. Our aim is to maintain our current level of fuel efficiency whilst looking at trials of the next generation of technology, diesel-hybrids, and cleaner fuels.

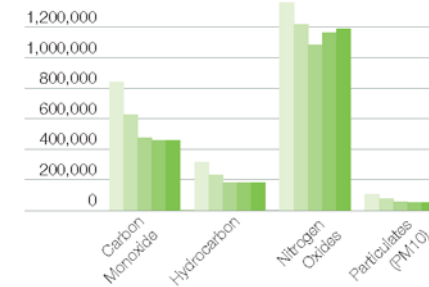
Water Consumption

In our bus operations all our wash plants are partially recycling - we use 55 m3 of water per bus per year. We have plans to introduce new technology which we hope will dramatically reduce this.

Fact:

- 29% decrease in energy usage at our West Midlands Travel bus garages, and a total decrease of 37% over three years.

ESTIMATED EXHAUST EMISSIONS FROM BUS OPERATIONS (KG)



In 2006 there has been a general reduction in emissions despite increased mileage of 5% compared to 2005. The figures have been calculated assuming an average speed of 18kmph using a spreadsheet model developed by the NAEI which has speed-emission related factors for different categories of vehicles.

There has been dramatic reductions in the baseline emissions arising from our buses over the last five years, due to continued investment in new vehicles. We estimate that emissions of PM10^{*} (see graph) have been reduced by 51% and those for NOx by 13%.

CASE STUDIES FROM national express



Promoting bus and coach travel



Getting more people on board smarter bus travel

■ The bus and coach industry can make a **significant contribution** to tackling **climate change** through passenger growth.

■ If **every bus** took just one more car driver we could save up to **1.2 million tonnes CO₂ per annum**.

■ Greater bus **patronage** would **reduce congestion**.



Go-Ahead's companies delivering environmental benefits from their communities

Go-Ahead believes that public transport is best delivered at a local level. It is committed to a devolved philosophy - where each company is trusted to deliver the transport solutions which are best for the communities they operate in - including environmental delivery. Brighton & Hove and Oxford Bus Company are regularly held out as examples of best practice.

We have installed Continuously Regenerative Traps (CRTs) on all of our vehicles, (where applicable) to limit the volume of emissions from our fleet. CRTs can reduce emissions by up to 90%. Our robust maintenance schedule includes a regular emissions test every five weeks for all of our buses. Our systems are independently assessed by VOSA who also carry out annual and random emissions tests. Oxford Bus Company has the greenest fleet in the UK.

Our responsibility: protecting the environment - In addition to reducing the carbon emissions from our bus journeys, we also have a responsibility to minimise the other environmental impacts of our operations. Last year we invested in a new Building Management System for our Cowley House depot, which controls temperature within the building. We have appointed an Energy Champion who is responsible for setting the temperature in general areas, particularly the workshops. The system controls both heating and air conditioning and is designed to switch off automatically outside of operational hours. This reduces gas consumption, fuel bills and accompanying carbon emissions. We have also established an energy team, to outline further energy saving measures and raise employee

awareness of the issue. Articles in our staff newsletter 'Oxfordward' bring the issue of saving energy to everyone's attention. We are accredited to the Carbon Trust Energy Efficiency Accreditation Scheme and plan to reduce electricity consumption at the depot by 10% this year.

As fuel costs continue to rise, training our drivers in fuel-efficient driving techniques is a priority for our business; it cuts not only fuel consumption but also the carbon emissions of our fleet. Fuel-use monitoring technology installed on our vehicles allows us to identify best practice and target training where it is most required. Our target is to reduce fuel consumption by 6% during 2008.

Since 1999, every new bus purchased by the Brighton & Hove Bus and Coach Company has been fitted with a Continuously Regenerative Trap (CRT), or equivalent technology, limiting the volume of its emissions. Our buses are also fitted with the latest Euro 4-standard engine emission controls, and regular annual investment in new buses allows us to take advantage of improving technology all the time. During the last year we introduced 18 modern Scania Omnidekka buses in Brighton.

CASE STUDIES FROM *Go-Ahead*



Making coach and bus travel more attractive

Investment in new **vehicles** offers customers improved **access, comfort** and **safety**.

Investment in new technology has improved **reliability** and **punctuality**.

Development of **local authority** partnerships has helped to address the issues that cause **journey delays**.

Growth in **technology** has enhanced **customer** access to information such as real time **updates** at bus stops, and **messaging** via mobile **phone** and internet.



Enhanced environmentally friendly vehicles at Arriva Midlands

While the Euro 5 environmental standard for buses does not become compulsory until October 2009, bus operators are already looking to those standards and beyond to continue the improvements in vehicle emissions which have been seen to date.

In October 2007 Arriva introduced five new 'Enhanced Environmentally-friendly Vehicle' (EEV) buses into its Midlands fleet. The low floor easy access buses were the first in UK passenger service to meet the EEV requirements - the most stringent EU emissions standard, going beyond the requirements of the Euro 5 and far exceeding the current mandatory environmental standards.

The voluntary EEV standards require even lower emissions of carbon monoxide (CO), nitrogen oxides (NOx), non-methane hydrocarbons (NMHC) and particulate matter than Euro 5 and the WrightBus/VDL vehicles perform better than the standard without any measurable increase in fuel consumption.

The EEV buses have been operating on Arriva's route 74 and 75 Chaselinx services between Cannock and Stafford and linking Stafford Hospital and Cannock Chase Hospital. The buses were introduced through a partnership between Arriva Midlands, bus builder WrightBus/VDL, Staffordshire County Council, and Mid Staffordshire NHS Trust.

As well as helping the bus to extend its environmental advantage over alternative forms of transport, the upgraded services are helping to reduce car traffic to the hospitals. This in turn reduces emissions both by having fewer vehicles on the road and reducing congestion-related emissions by remaining road-users.

CASE STUDY FROM  **ARRIVA**



Making coach and bus travel more attractive

■ **Integrated** ticketing between different **transport modes** has made onward travel easier.

■ **Partnerships** with major employers, colleges, universities and **hospitals** are improving more **sustainable travel** options to their employees.

■ Engagement with **customers** has improved through **market research**, passenger focus groups and **satisfaction** surveys.

■ Improved **training** of **employees** has provided better **customer focus** and safer **higher** quality **services**.



Carbon management programme

Stagecoach has established a cross-functional Environment Strategy Working Group to ensure the Group continues to meet the challenges and opportunities from the impact of climate change.

The core element of the Group's strategy is focused on the development of a Group-wide Carbon Management Programme (CMP), which will produce energy saving recommendations, assist in the development of new energy and environmental policies, set agreed key performance indicators and targets for improvement, and put in place a range of project plans to achieve these objectives.

Stagecoach is already progressing a number of initiatives, including investment in renewable fuels and cleaner engines, introduction of energy management systems, water and waste recycling projects and offering businesses green travel incentives for their employees.

Carbon neutral travel

Stagecoach has launched Scotland's first carbon neutral bus network.

The ground-breaking environmental initiative, in partnership Scottish charity Global Trees, will see all of Stagecoach's Fife to Edinburgh bus network become carbon neutral for the next five years. Around 140,000 trees will be planted in the south of Scotland this year, saving 21,500 tonnes in CO₂ emissions.

CASE STUDIES FROM  **Stagecoach**



Easing the way ahead for coach travel

Our vision for transport in 2008 is that More is Less; the more we extend the provision of public transport, the more people use it instead of cars or planes and the less CO₂ and pollution will be released into our atmosphere, therefore allowing a cleaner and better quality of life for all.

The more we do, the greater the environmental and social benefits. At National Express there are positive benefits from the use of our services - both for society and the environment - so we believe our responsibility is to grow our operations. In the medium term this may mean us generating more CO₂ - if that contributes to a wider reduction overall. By doing more, we'll produce less of the things our society doesn't want....

Waste Management

Non-hazardous waste is generated by our customers and offices. We have introduced award winning recycling programmes which we are rolling out across our business units. Overall the percentage of waste not going to landfill is around 15% although this is difficult to accurately estimate as our non-hazardous waste collection are not generally weighed individually so we rely on estimates using average weights for different containers. We plan to increase the quantity of waste recycled.

Nearly 95% of our hazardous waste is recycled.

Dedication

Our growing dedicated services to Wembley Stadium from across the country have proved very popular and enabled thousands of football and concert fans to reach the venue in comfort whilst minimising their carbon footprint.

RELATIVE GHG EMISSIONS OF COACH COMPARED TO CAR

NET SAVINGS OF
284,996 tCO₂e
FROM USING A COACH
INSTEAD OF A CAR



This diagram illustrates the emissions saved when people use a National Express coach instead of travelling by a car. The coach represents the actual emissions produced by our coach operations in 2006, while the car shows what the emissions would have been had 80% of our customers travelled by car instead.

CASE STUDIES FROM national express



Making our bus and coach services greener



Investment in greener travel

A total of **£610 million** has been invested in **5,100 new vehicles** over the past 3 years by the **UK's 5 largest companies**.

New vehicles emit significantly **lower emissions** of pollutants affecting local **air quality** such as **particulates** and nitric oxides.

Manufacturers **design** and build to higher standards of passenger **comfort** and **safety** and all have low floor access.

The **average** age of buses is now **under 8 years**.

Future generations of vehicles will have **lower carbon** emissions with the potential for **sustainable renewable fuels**.

Trials are on-going of **alternative technology** vehicles such as **hybrid** and **hydrogen** buses.

Waste recycling

First West Yorkshire (Halifax) is an excellent example of best practice in waste management where 56% of non-hazardous waste is recycled. The majority of the waste is inherited from cleaning the buses and the staff segregate the waste into plastic bottles, steel and aluminium drinks cans, paper, glass, plastic drinks cups and plastic bags. Over the last 12 months alone, this scheme has diverted 47 tonnes of waste away from landfill.

First Leeds (Hunslet Park depot) also recently demonstrated that segregating waste on buses for recycling brings great results. Drink cans, paper, cardboard and plastic is separated and placed in a mixed recycling bin. Early figures show that 60% of waste left by passengers on buses is now sent for recycling.

The hydrogen alternative

Working in Partnership with Transport for London, FirstGroup was involved in trialling a number of Hydrogen buses between 2004 and 2007.

The reliability of the technology used in these buses far exceeded expectation and the buses proved popular with passengers who showed interest in the technology. The only emission from a fuel cell bus is water. Provided the hydrogen is generated from renewable energy this could offer a low carbon technology for the future. Current barriers to more wide-spread introduction of hydrogen vehicles are the costs of the vehicles and the need to install a

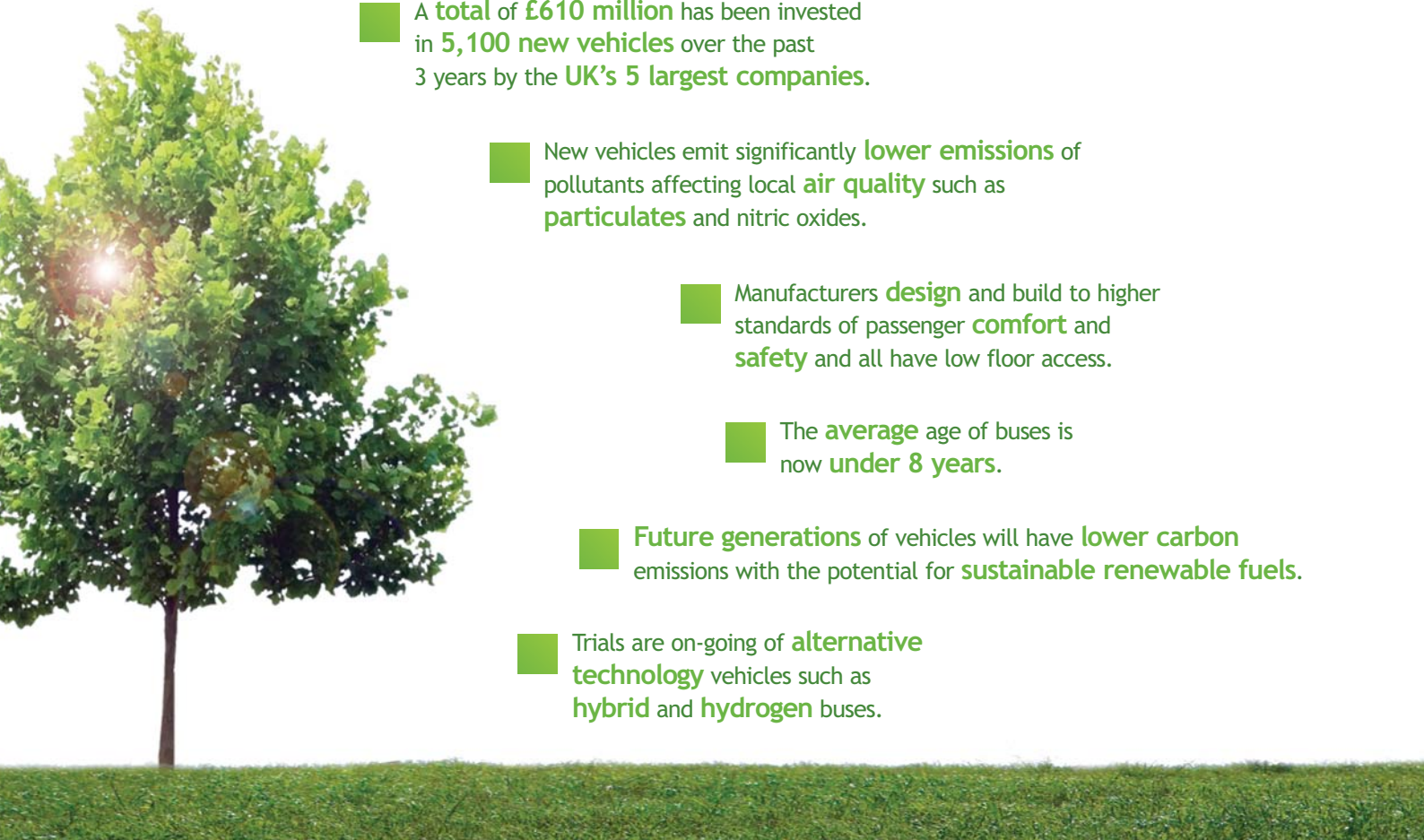
supporting infrastructure. Based on the success of this project FirstGroup will be working with Transport for London who are planning to deploy 10 of the next generation of hydrogen buses by late 2009.

Reducing emissions to air

During the past three years FirstGroup has invested around £200 million in new vehicles.

These vehicles are all designed to the highest specification to ensure maximum passenger comfort and safety and are fitted with low floor access. Buses emit lower concentrations of air pollutants per passenger journey than the car and investment in new vehicles contributes to ensuring the emissions of these pollutants continue to reduce. For example since 2001 emissions of particulates from the FirstGroup bus fleet have reduced by 65% (314 tonnes per year) and emissions of nitric oxides by 39% (2,975 tonnes per year). The company is now introducing the latest EURO IV engines and in partnership with BAA has introduced EURO V engines for the Slough/M Maidenhead/Heathrow route.

CASE STUDIES FROM  transforming travel



 ARRIVA

 First
transforming travel

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Improving our own environmental performance

■ Reducing energy **consumption** through investment in new buildings and workshops, **temperature** control systems and **smart metering**.

■ Sourcing **electricity** from renewables.

■ Water **consumption reduction** through investment in low **usage/recycling** devices.

■ Improvements in **waste** management by recycling of **passenger, maintenance** and **office** waste.

■ Staff **engagement** in environmental management through **training** and **development**.

Go-Ahead London environmental work

Go-Ahead's many London bus operations (London General, London Central and Metrobus etc). It is one of the largest bus operators in the largest bus market in the UK.

Go-Ahead has established targets for all its companies operating in the UK to reduce energy usage by 10% and fuel by 5% during 2008. We have committed to doubling these targets, to achieve reductions of 20% and 10% respectively.

This year we introduced new buses to our routes 24 and 453. These vehicles are powered by engines that meet the new Euro 5 EEV standard, delivering new standards of fuel efficiency and reduced emissions. We were the first bus company in the UK to introduce buses powered by engines that meet Euro 4 standards to our regular services. We use Ultra Low Sulphur biodiesel to fuel our buses and limit carbon emissions. In partnership with TfL, we continue to trial diesel-electric hybrid buses on route 360 and we expect these hybrid vehicles to reduce emissions by at least 30% compared to a conventional diesel bus.

We install Continuously Regenerative Traps (CRT's) or equivalent technology to limit the volume of emissions from our fleet. These traps can reduce emissions by up to 90%. We are also trialling industry-leading, real-time, fuel-use monitoring technology that will enable us to reduce fuel consumption further, and include instruction on energy-efficient driving in our regular refresher training.

CASE STUDIES FROM **Go-Ahead**



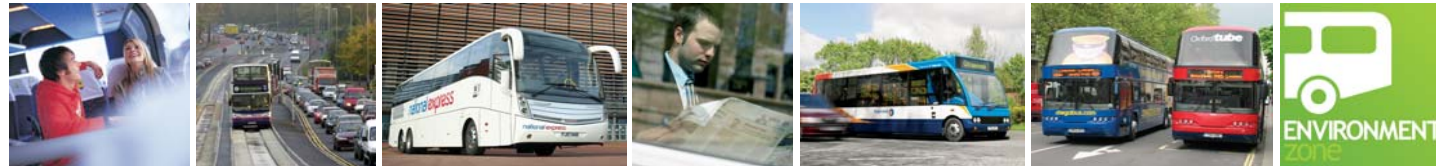
Smarter, safer driving

■ Driving **technique** has an influence on the **fuel efficiency** of a vehicle.

■ Significant developments in **driver training** standards are improving skills in **safe** and **fuel efficient** driving.

■ Developments in **technology** are being used to **enhance** this process through use of state of the art **equipment** such as **driver simulators**, **drivecams** and **dashboard messaging**.

■ New continuous **development requirements** for drivers will **cover safety**, customer service and **fuel efficient** driving



Fastrack bus rapid transit is the green transport solution for Kent Thameside

The area around Dartford and Gravesham known as Kent Thameside is one of the UK's growth hotspots, where regeneration and new development is expected to bring up to 50,000 new jobs and 30,000 new homes over the next 30 years. Planners at the Kent Thameside Regeneration Partnership recognised from the outset that this amount of development required a viable alternative to the car for local journeys so as to avoid gridlock.

The award winning bus rapid transport system known as Fastrack was launched in 2006 and will ultimately connect all the key existing and new developments in Dartford and Gravesham. The flexibility and scalability of the bus rapid transport approach were key for this area as the infrastructure will be introduced alongside the various phases of development. As a bus-based system Fastrack has that flexibility, yet at the same time offers the reliability and attractiveness of a modern tram, with its dedicated busways and other infrastructure, and prioritisation at junctions. Fastrack's phased development is now planned ahead for the next decade.

The key to Fastrack's success was in making it a real alternative to the car for local journeys, thereby delivering the twin environmental wins of reduced congestion and lower emissions. The service features high quality modern vehicles meeting the Euro 5 environmental emissions standard.

Running a frequent 'turn up and go' service, its timetable reliability is ensured through using segregated track wherever possible and with effective priority over other traffic elsewhere.

Fastrack has:

- A new fleet of modern, high-specification vehicles
- Dedicated busways to bypass congestion hotspots
- Bus lanes to avoid other traffic
- Priority at junctions for Fastrack vehicles over other traffic
- New halts with improved waiting facilities
- Services linking key destinations
- High frequency services running, starting earlier in the day and finishing later
- Much improved journey times and reliability

In its first six months of operation almost 20 per cent of Fastrack passengers said they would have previously used the car for the journey. Applied to the total of more than 3.5 million passenger journeys made on Fastrack since its launch, it represents at least 700,000 journeys for which people have been persuaded to leave the car at home.

CASE STUDY FROM ARRIVA



Increased speed, reduced emissions

National Express are pleased to continue investing in new engines which deliver improved environmental performance, there is also another very effective way to reduce emissions: by speeding up bus traffic.

Even a relatively modest increase in average speed can have a marked effect on emissions of carbon monoxide, hydrocarbons, nitrogen oxide and particulate matter. The basic facts concerning emissions are similar to those relating to fuel consumption and are therefore familiar to every car driver. Optimum performance is achieved not at slow or fast speeds, but in the middle of the range. By working in partnership with local governments and other authorities to introduce bus priority measures such as bus lanes, hard shoulder use and bus-friendly traffic lights, National Express aims to drive maximum environmental benefit from new engines.

Facts:

- Becoming the first UK transport group to switch to green tariff electricity. All the energy we use across our 300 sites, including depots, maintenance facilities and offices is now renewably sourced. The contract also provides electricity for the Midland Metro in the West Midlands, resulting in the line becoming the first light rail system in the UK to be effectively emission free.
- Founder member of the 'Together' Campaign, an exciting collaboration with other businesses and NGO's with the target of saving a tonne of

Carbon in every household in the UK. Working collectively, the campaign seeks to offer solutions to consumers to encourage sustainable behaviour change

RELATIVE GHG EMISSIONS OF BUS COMPARED TO CAR

NET SAVINGS OF
69,598 tCO₂e
FROM USING A BUS
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This diagram illustrates the emissions saved when people use a National Express bus instead of travelling by car. The bus represents the actual emissions produced by our bus operations in 2006, while the car shows what the emissions would have been had 80% of our customers travelled by car instead.

CASE STUDIES FROM national express



How can we enhance the contribution buses and coaches make?



Making buses and coaches a priority

More punctual/reliable **services** will attract more passengers.
This would be **promoted** by:

- Including public transport in all **planning decisions**.

- More **park and ride facilities**.

- More bus **priority** measures, bus lanes, **traffic light** priorities.

- Pro-public **transport** car parking regimes.

- Less congestion will **increase** the average speed of buses, which will in turn improve fuel **efficiency** and reduce **carbon emissions** from the vehicles.

Investment in cleaner buses

Stagecoach is investing in greener bus technology to meet new European emissions standards a year ahead of schedule.

The Group is making a record £71m investment in a fleet of 584 new vehicles for the UK during 2008-09. It includes orders totalling £30 million for more than 220 new buses and coaches that meet new tough Euro 5 emissions standards, which are not due to come into force until 1 September 2009.

These vehicles will use selective catalytic reduction (SCR) technology to reduce nitrogen oxides in the exhaust gas. The engine is optimised for low emissions of diesel particulates and low fuel consumption and, by adding a reducing agent, the nitrogen oxides produced during combustion are converted into harmless nitrogen and water vapour within a catalytic converter.

In the past three years, Stagecoach has invested around £200 million in new, cleaner buses to reduce its impact on the environment and the average age of its buses is now just seven years.

Fuel additive

Stagecoach uses a next-generation fuel additive, Envirox™, to reduce carbon emissions and improve fuel efficiency.

The additive, manufactured by Oxonica, is based on a well-known oxidation catalyst widely used in catalytic converters. The material has been re-engineered using nanotechnology to allow it to be delivered as a fuel-borne catalyst, leading to a cleaner burn within the combustion chamber. The additive has delivered more than a 5% cut in fuel consumption and an associated decrease in vehicle emissions. Stagecoach also currently uses a blend of 5% biodiesel across its 7,000-vehicle UK bus fleet.

CASE STUDIES FROM 



Tomorrow's transport: we need your support

A radical rethink on **vehicle design** and technology is required to significantly **reduce carbon emissions** from buses and coaches.

The fuel efficiency of **diesel vehicles** needs to **improve** in the short term.

New **technologies** need to come into place in the longer term supported by the **relevant infrastructure**.

Manufacturers need to rise to this challenge and develop **low carbon** vehicles taking account of **vehicle weight** and **efficiency**.



Gas buses in Arriva Scandinavia

While Arriva is recognised as one of the leading bus operators in Britain, the group also runs bus and train services in 11 other countries across Europe. Arriva's business in Scandinavia has been at the forefront of the adoption of natural gas and biogas fuelled vehicles to help minimise the environmental impact of operations.

Since 2005 the city of Helsingborg in southern Sweden has seen a 30% increase in bus use as part of a concerted campaign to improve the environment, particularly in relation to congestion and poor air quality in the city centre.

A key component of the environmental revolution in Helsingborg was the introduction that year of a brand new fleet of buses all running on biogas. The bus strategy developed by the city, the transport authority and operator Arriva has the aim of doubling bus use between 2005 and 2014. A facility next to the Arriva Helsingborg depot produces the biogas used to fuel Arriva's fleet of 61 gas buses.

Helsingborg city has worked to improve flow for buses, for example, by introducing special traffic lights for buses and by limiting car traffic along bus lanes to increase average speeds together with higher frequency services and new passenger information and bus stops.

The two pronged approach of encouraging more travellers to take the bus and adopting vehicles which meet the strictest environmental standards are paying dividends for Helsingborg with lower overall greenhouse gas emissions.

Building on the experience in Helsingborg, Arriva Scandinavia is now introducing buses powered by liquefied natural gas and ethanol in the Stockholm area and planning to introduce natural gas and biogas powered vehicles in Denmark.

As the largest bus operator in Denmark Arriva is being proactive in taking proposals to reduce greenhouse gas emissions by using more buses running on natural gas and biogas to the regional transport authorities. The company has 67 new gas buses going in to service this autumn.

CASE STUDY FROM ARRIVA



There are...

- Over **4 billion passenger** journey per year on public **transport vehicles**.
- Nearly **50 billion passenger** kilometres travelled by people on **buses and coaches** each year.
- **170,000 people** employed in the **bus and coach** industry.

(source: Department for Transport)

For additional copies or alternatively, an electronic version supplied on a USB Key contact:



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