

# *Second Report on Road Transport Best Industry Practices*





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## Introduction to the second volume of the Report on Road Transport Best Industry Practices

**The International Road Transport Union (IRU) is a confederation of national road transport associations, together comprising the entire road transport industry worldwide, both carriers of passengers and of freight. It speaks for the operators of buses, coaches, taxis and trucks, from large transport fleets to small family companies.**

At the 1992 Rio Earth Summit, member governments of the United Nations adopted *Agenda 21*, the comprehensive blueprint for achieving sustainable development world-wide. As called for in *Agenda 21*, the road transport industry developed the *IRU Charter for Sustainable Development*, which was unanimously adopted by all IRU Members at its World Congress in Budapest in 1996. The proactive *IRU Charter* is a commitment by the entire road transport industry to drive towards sustainable development. To date, road transport is the only mode of transport that has committed itself to this common goal.

The *IRU Charter* was followed by the IRU initiative *Driving Towards Sustainable Development*. This initiative specified the principles and prerequisites required to achieve the common goal of sustainable development.

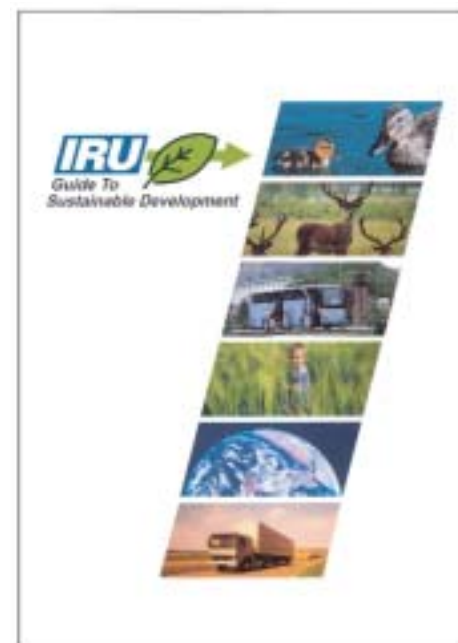
### **The critical success factors for achieving sustainable development are:**

- Innovation: to develop ever more effective “at-source” technical measures & operating

practices to reduce environmental impact.

- Incentives: to encourage faster introduction by transport operators of best available technology and practices.
- Infrastructure: without free-flowing traffic, above measures are useless. Adequate investment in new infrastructure to remove bottlenecks and missing links, plus fullest use of existing infrastructure, are essential.

In September 2000, the IRU published the *IRU Guide to Sustainable Development*. The *IRU Guide* presents national action programmes from IRU Member Associations from Denmark, Germany, the Netherlands, Norway, Sweden, and the United Kingdom, which have pioneered sustainable development in road transport.



These programmes emphasise measures that significantly improve environmental performance, transport, safety, fuel efficiency, consideration for other road users, and profitability.

The *Guide* as such is designed to be a flexible reference and modular aid for all national IRU Member Associations. The IRU Members can choose from the *Guide* those modules that will best contribute to sustainable development in their particular situation.

### **The IRU Report on Best Industry Practices**

The *IRU Report on Best Industry Practices* is a follow-up to the *IRU Guide to Sustainable Development*. Using a bottom-up rather than a top-down approach, it presents examples of best practice in sustainable development from the road transport industry. The objective of this report is to demonstrate progress in the implementation of sustainable practices at transport operator level and to confirm that best practices are profitable (sustainability = profitability). The report should not only encourage all road transport operators to imitate best industry practices (learning from the best), but also provide public recognition of the transport sector's considerable achievements in the field of sustainable development.

The publication of the first volume of the Report in 2002 triggered a kind of snowball



effect: A large number of companies contacted the IRU and informed us of environment-friendly measures they implemented; the best of which have been documented in this second volume.

The success stories recounted in the *IRU Report on Best Industry Practices* prove that the IRU strategy for sustainable development works and provide practical examples of sustainable development contributing to companies' profitability.

Last but not least, the IRU wishes to thank the Fraunhofer Institute for Material Flow and Logistics for their excellent work in compiling the companies' information for this Report.



# ECOLOGUS – Ecoefficient Distribution in Évora

ECOLOGUS

**P**

Nine transport companies from the region of Évora have joined forces, monitored by the Portuguese national road transport association ANTRAM (Associação Nacional dos Transportadores), to develop and implement the ECOLOGUS project:

- STA – Sociedade de Transportes do Alentejo, Arraiolos.  
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- Transportes Mercadorias Filiana, Évora.  
Contact: D. Maria do Rosário
- ETU – Empresa de Transportes Urgentes, Évora.  
Contact: Sr. Domingos Candeias
- Transelva, Elvas.  
Contact: Sr. Vinagre
- Transnil, Portalegre.  
Contact: Sr. Mário Afonso
- Transportes Sem Pavor, Évora.  
Contact: Sr. Joaquim Silveira
- Transportes Eborense, Évora.  
Contact Sr. Pessoa
- UCC – União de Camionagem de Carga, Évora.  
Contact: Sr. Adérito
- Transportes Bárbara e Boa Fé, Évora.  
Contact: D. Bárbara

Évora is a city in the heart of Alentejo, a region of wide plains located 130 km east of Lisbon. Part of the town is enclosed by ancient walls, preserved in their original state, which surround several interesting monuments dating from various historical periods and architectural styles (Romanesque, Gothic, Manueline, Mannerism and Baroque). These monuments are all included on UNESCO's World Heritage list. Today, the beautiful historical centre has approximately 4'000 buildings and an area of 105 hectares.



The delivery of goods in Évora is a huge problem that has a negative impact on the preservation of monuments and the quality of life. The present distribution model is based on conventional diesel vehicles and on the following organizational structure:

Actual Distribution Model

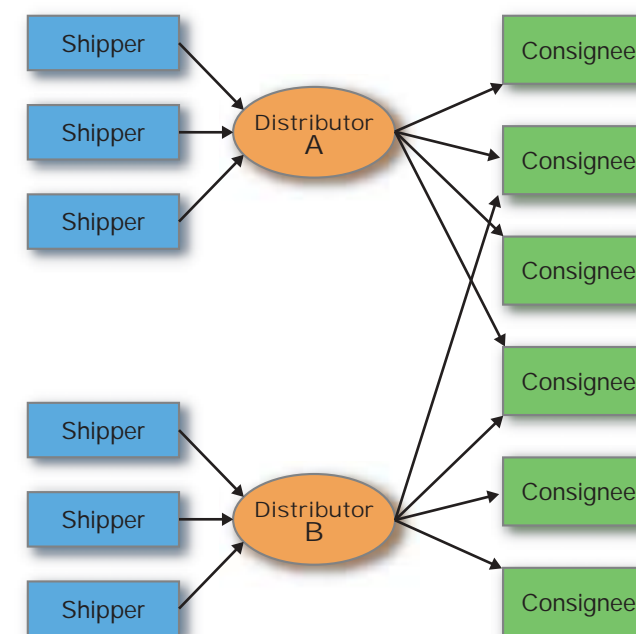


Diagram showing the existing organizational model

The nine transport companies, who are associated with and supported by ANTRAM, developed a sustainable distribution system for Évora. The goals of this system are to:

- Guarantee the economical distribution of goods.
- Reduce environmental impact (especially on buildings).
- Improve the flow of traffic within the city.
- Improve the image of the transport sector.

The new distribution system is being implemented and has the following features:

- Biodiesel vehicles that are adapted to the narrow streets of Évora.
- A central warehouse, located outside of the city centre, for grouping deliveries.
- Involvement of the companies, creating an autonomous legal identity.
- Definition of a specified area in which the new distribution system operates.



## COSTS

The nine transport companies associated with ANTRAM are currently faced with the situation presented in the column "Actual situation" of the following table. In the near future, this situation will become more difficult because of new distribution regulations for the historical centre of the town. The distribution costs per day for the ECOLOGUS system presented in the column ECOLOGUS include the costs for the central warehouse for the bundling of different shipments.

Thus, the following benefits are expected from the ECOLOGUS distribution system:

- The cost/kg will be kept to a reasonable amount (circa EUR 30/ton).
- The total income of the associated companies will increase.



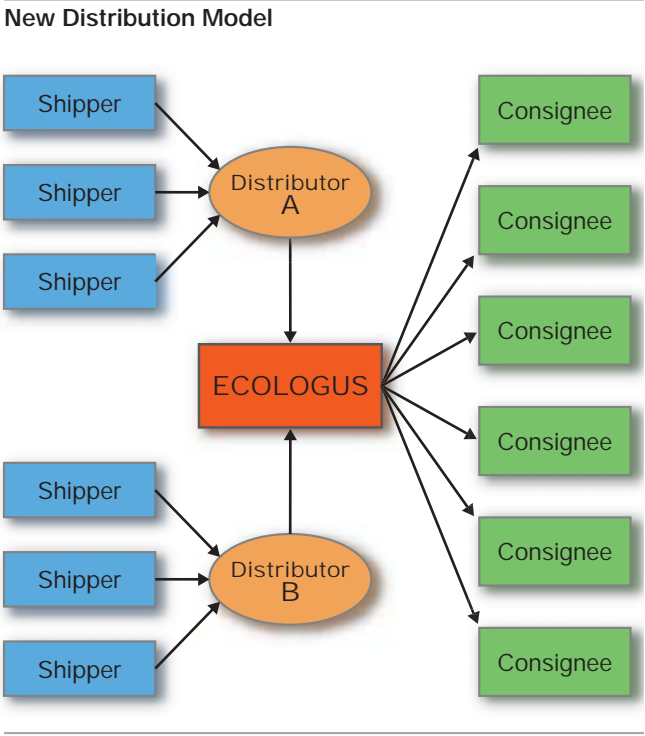


Diagram showing the new organisational model

**Comparison of actual and new distribution models**

Distribution in Évora	Actual situation	New Situation (new circulation rules)	ECOLOGUS
■ Total dedicated vehicles	14	25	10
■ Median gross weight	4.1 tons	3.5 tons	3.5 tons
■ Tons carried per day	46 tons	46 tons	46 tons
■ Vehicle cost per day	EUR 78.31	EUR 78.31	EUR 82.29
■ Distribution cost per day	EUR 1'096.70	EUR 1'957.78	EUR 1'376.56
■ Cost /ton	EUR 23.84	EUR 42.56	EUR 29.93



**BENEFITS FOR THE ENVIRONMENT**

This new concept will benefit the environment by:

- Decreasing the number of trips per day and vehicle by 35% — from 32 trips/day with 14 vehicles to a maximum of 21 trips/day with 10 vehicles.
- Reducing emissions: If the fleet of the ECOLOGUS system uses normal diesel fuel, emissions are reduced at least by 35%. If the fleet uses biodiesel, the overall emissions impact for CO<sub>2</sub> emissions will be zero, as biodiesel is a renewable primary resource. The CO<sub>2</sub> released into the atmosphere by the burning of biodiesel is recycled by the plants used for producing the biodiesel.



**BENEFITS FOR THE COMPANY**

The ECOLOGUS distribution system is designed to guarantee the profitability of the business of the member companies. Their current form of operation is threatened by the new regulations for distribution within the city centre. Thus, a new organizational model is necessary to prevent the total collapse of the distribution system. Finally, the project is an opportunity to improve the image of the transport sector.

**OUTLOOK**

At the moment, ANTRAM together with the named companies is in the implementation phase of the project.



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# Wet Gritting of Winter Roads



**ATL**  
AB TRANSPORT & LOGISTICS

**S**

ATL is a haulage group comprising of Piteå LBC and Älvsby LBC. ATL has 44 employees and a total of 210 drivers and 160 trucks, 120 trailers, and 100 contract machines. ATL provides services and products within the field of transport, machinery-intensive contracts, contract machinery work, gravel and chipping products, topsoil, and green spaces. The ATL group also has crushing installations, gravel extraction, a workshop, and offices in Piteå, Älvsbyn, and Boden. The company's turnover increased rapidly from SEK 100 million (EUR 10'966'000) in 1996 to SEK 310 million (EUR 33'994'600) in 2001.

ATL is certified according to ISO 9002 standards and also to ISO 14001. The owners and staff of the haulage companies have participated in an environmental training program and have their own quality and environmental handbooks. The driver's handbook and the operation manual also outline the group's drug policy.

During the winter of 2001/2002, ATL worked together with the haulage company Öhgrens Åkeri AB to improve an older method for wet gritting winter roads. With this BIP, ATL is able to sell a method for gritting roads that is environmentally friendly and cost efficient.

ATL tested their improved method with their customers to measure friction and determine the possibility of reducing the amount of sand that is used. The costs estimations for this method have also been subjected to thorough examinations. The BIP was started in November 2000 and the first prototype was finished in January 2001. The equipment was tested and improved during the winter of 2001/2002. The goals for this project have been achieved and the results are very good.



Moist grit being launched via a rotating disc

The primary reason for updating the older method of gritting was because of the decision by the National Roads Administration to reduce the amount of salt that was used with grit. This led to the reintroduction of the older method of mixing sand with water. This method can be used from -2°C and below and has been used as low as -30°C. Experiments have shown that when wet gritting is used, the friction on winter roads is the same as summer roads. This experiment was very well received by motorists, particularly by commercial drivers.



The above photograph shows the pattern formed directly after the dispersal of moist grit



A close up of the pattern formation



The most critical issue was to find a cost-efficient method of making the grit stay on the road instead of blowing away as it does with the current method. At the same time, ATL wanted to use less sand and avoid the use of chemicals. The method was developed in cooperation with Öhgrens Åkeri, one of ATL's haulage companies, and with Vägverket (National Road Association), who is an important customer of ATL.



**COSTS**  
It cost approximately SEK 1 million (EUR 109'660) to develop this method.

**BENEFITS FOR THE COMPANY**

- No salt is used.
- Less rust on cars.
- Reindeers are fond of eating salt. With no salt in the grit they are more likely to stay off the roads, which reduces the risk of accidents.

Other advantages are that drivers are more satisfied and ATL has improved road safety.

**BENEFITS FOR THE ENVIRONMENT**

The wet gritting method does not use any salt and uses considerably less grit. The grit stays on the road surface longer than conventional grit, which quickly blows off the road. The current gritting method uses 1% salt in the grit mix. The new method uses only one third of the amount of sand that the current method uses and the sand stays much longer on the road.

For the coming winter, the Swedish National Road Association has decided that it will only consider hiring maintenance companies that have access to wet gritting technology to take care of the winter roads. As a result of this decision, ATL will have an excellent opportunity to win contracts with its tested technology.



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# Improvement of the Utilisation Rate by 6-Section Vehicles

CARL F AB

S

Carl F, founded in 1888, offers a wide range of transport-related solutions, including waste recovery. It is a local company which operates within a range of approximately 60 km. Its headquarters are located in Malmö. Carl F has its own sorting plant for industrial waste and 2'600 containers. The company operates 35 heavy trucks and employs 60 people, including 40 drivers. Every year circa 20'000 tonnes of waste are sorted and 99% of the waste is reused or recycled.

In 2001, the company transported 51'813 tonnes of waste. The turnover has increased considerably in the past years. The turnover was SEK 69 million (EUR 7.6 million) in 2001, double the turnover generated in 1995.

As part of the company's ISO 14001 work, the employees spend a weekend learning about environmental work and how it can be realised.

The company has been particularly successful in introducing waste and garbage trucks equipped to collect waste from offices and light industry. The space in these trucks is divided into six different sections for batteries, electronic waste, glass, hard plastic, lighting tubes, and metal waste. The most common vehicles are provided with only two sections; e.g. to transport coloured and uncoloured glass.



During collection, all waste is weighed and recorded, simplifying environmental accounting for their customers. With the ability to weigh waste, Carl F can give statistics to companies that work with ISO 14001. Many Swedish companies will only work with other companies doing environmental work on a permanent basis, for example via ISO 14001. This clearly demonstrates to the customers that the company takes environmental issues into account.



## Eco-Driving Project

### COSTS

The extra costs per vehicle are SEK 550'000 (EUR 60'313). Thus, these special vehicles cost 40-50% more than conventional vehicles.

### BENEFITS FOR THE ENVIRONMENT

These vehicles allow you to transport six different types of waste in one trip instead of in six separate trips. The estimated fuel reduction will be more than 50%.

### BENEFITS FOR THE COMPANY

The 6-section vehicles can be used very flexible as a conventional dumper or as a multiple section vehicle with 6 or, if needed, with 8 sections with lower capacity.

The use of 6-section vehicles with the integrated weighting-machine has simplified the environmental work of Carl F's customers and has also resulted in the acquisition of new customers. Many companies have realized that this is an

easy way to improve their environmental work and, therefore, switched to the services of Carl F. The customers are very satisfied. These vehicles are a cheap and easy way of handling waste while improving one's environmental image.

### OUTLOOK

Carl F is going to continue marketing their services towards companies that care about the environment.



The company has recently introduced an eco-driving project in order to enable its drivers to drive more considerately and fuel efficiently. Carl F wants to reduce costs and, at the same time, minimise environmental impact. The company is also convinced that smoother driving will make their vehicles last longer.

This eco-driving project is part of a fundamental change in the salary system. All drivers participate in this project. Carl F's fuel consumption is measured every second month. The figures are placed on the company's notice board so that everybody can see who has driven fuel efficiently. If they drive carefully and have low fuel consumption, Carl F will motivate them by rewarding them. The amount of the bonus is determined on a yearly basis after an analysis of the past year. The whole process of putting the bonus system into practice took six years.

At the beginning, many of the drivers felt uneasy with the system but now the majority of them support it.



### COSTS

Higher personnel costs

### BENEFITS FOR THE COMPANY

The employees are enthusiastic and they enjoy the challenge of saving fuel. The best drivers plan their routes and try to anticipate the behaviour of the other drivers on the road. This also reduces repair and maintenance costs.

### BENEFITS FOR THE ENVIRONMENT

The drivers used 5-20% less fuel. However, it is hard to estimate the exact impact of this system on fuel consumption because many of the trucks drive in the city. The benefits will have to be evaluated on a long-term basis.

### OUTLOOK

The company hopes to attract good drivers for the future.

### CONTACTS

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# Pollution Reduction using Environmental Management System (EMS)



CITESA

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The CITESA group is dedicated to the transport and distribution of gases and petroleum products, transport of chemical products, and general cargo at both a national and international level, including Europe and South America.

The tank and container fleet of CITESA consists of 41 semitrailer tractor units, 496 semitrailers, 45 trucks, 15 containers, and 5 container carriers. The fleet can also be used for powder, gaseous, and liquid chemicals and asphalt products. CITESA has a total warehouse area of 59'000 m<sup>2</sup>, a staff of 379, and an annual turnover of circa EUR 36 million.

The Spanish Association for standardization and certification (AENOR) certifies that CITESA has implemented a quality management system that complies with the requirements of the standard ISO 9002, and an environmental management system that complies with the requirements of the standard ISO 14001 as well as the European Regulation 761/2001. Furthermore CITESA has realized a SQAS (Safety and Quality Assessment System) audit, obtaining a general result of 98.3%.



One of the requirements of the EMAS Environmental Management System implemented by CITESA is an annual environmental declaration. The simplified declaration for the year 2000 contains the following:

- The main environmental aspects of the activities of CITESA.
- The results of the objectives that were set in 1999.
- The environmental management program for the year 2000.
- A list of figures summarizing the environmental impact of CITESA's activities, for example, the consumption of energy and primary resources, harmful substances in wastewater and waste, and noise and combustion emissions of the vehicles.

The main types of environmental impacts that result from CITESA's activities are indicated in the declaration.

These impacts are as follows:

- Fuel consumption of the vehicles.
- Noise and exhaust emissions of the vehicles.
- Leakage, spillages, and gaseous emissions caused by accidents and produced during loading and unloading.
- Wastewater of the truck-washing facility.



## COSTS

The cost for the hydrocarbon separator was circa EUR 9'000.

## BENEFITS FOR THE ENVIRONMENT

The separator prevents hydrocarbons from getting into the wastewater system, where they could cause the formation of a highly explosive mixture of gases. Every year, approximately 1'800 trucks are washed in CITESA's truck-washing facility and 2'000 m<sup>3</sup> of water are used. The quantity of hydrocarbons detected in the wastewater after it has passed through the separator is only 13.5 mg/l.

## BENEFITS FOR THE COMPANY

The EMAS helps CITESA meet environmental requirements, ensure that goods are transported safely, and reduce the environmental impacts produced by their activities. These benefits are especially important for a company whose field of business is chemical and petroleum products.



## OUTLOOK

Grease and hydrocarbons separators will also be installed at another CITESA site in Lérida. Furthermore, special connections will be installed for liquefied petroleum gas (LPG) tanks to avoid emissions escaping into the atmosphere while the tubes are being connected and disconnected for loading and unloading.



In the action plan for 2000, a concrete measure was defined that addressed the wastewater of the truck-washing facility. A hydrocarbon separator was bought and installed to improve the quality of the wastewater.



## Prevention of Accidents using Simulation

Every year, CITESA simulates accidents in an effort to reduce pollution caused by accidents involving dangerous goods. CITESA customers, local firemen, civil defense workers, and workers from other institutions participate in these simulations. The goal of the simulations is to practice using the emergency plans and CITESA's special emergency equipment. A further goal is to refresh the training of the six employees who have received special emergency training. For its daily operation, CITESA provides a 24-hour service to ensure a fast response time in the case of an emergency.



### BENEFITS FOR THE ENVIRONMENT

Accidents that occur while chemical or petroleum products are being transported can cause extreme damage to the environment. Although it is difficult to estimate the actual benefit that the accident simulations provide for the environment, they help minimize environmental impacts once a serious accident happens.

### BENEFITS FOR THE COMPANY

By always having the right equipment for emergencies on hand and by working together with LAVAFIX, S.A. for assistance in emergencies, CITESA is able to react quickly to any emergency while keeping costs low.

### COSTS

The cost for the special emergency equipment was circa EUR 60'000. Each accident simulation cost circa EUR 3'000.

### OUTLOOK

As they have in the past 25 years, CITESA will continue to strive toward being perfectly prepared for possible incidents.


### CONTACTS

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## Optimisation of Internal Logistics

Both BIP mentioned here have to be seen as one aspect of the introduction of the integrated quality and environmental management system. The introduction and certification of this project was carried out by participation in a project group, consisting of about ten transport companies. This project was accompanied by consultants of various disciplines and was coordinated by Transport en Logistiek Nederland (TLN).



**DUIJGHUIJZEN**



Duijghuijzen Transport Company was founded in the 1920s and was initially active in transporting livestock. Gradually, the focus shifted towards transporting bricks and ceramic products, such as tiles and bathroom equipment. In the past years, this specialisation was expanded to include complete logistic services for ceramics and other construction materials in the Benelux region.

The company has a fleet of 25 trucks. The total number of employees is 49, including 27 drivers. The annual turnover is circa EUR 6 million. The company operates a 6'000 m<sup>2</sup> warehouse at its location in Beuningen.

Lloyd's Register Quality Assurance certified their quality assurance system in 1991 according to ISO 9002. In 1993, Duijghuijzen Transport Company was the first, and, so far, the only road carrier to be awarded the Gelderland Environment Prize. In March 1998, the company's environmental management system was fully certified according to the ISO 14001 standard.



Two key measures were implemented in order to optimise the logistical efficiency at the company's site in Beuningen:

- Transition to an environmental-friendly type of fork-lift truck.
- Optimisation of the internal routes.

The new fork-lift truck uses significantly less fuel for its operation than previous lift trucks. It also has better and faster handling because foot pedals are placed for both directions.



The internal routes were optimised through the use of an extra roller shutter. This reduced transport distances between the different warehouses and kept transshipment points to a minimum. This measure was implemented after an internal examination of the logistic routes at the company site.



#### BENEFITS FOR THE ENVIRONMENT

- The new fork-lift truck uses about 20% less fuel than previous trucks. In absolute numbers, each hour of operation saves about 0.6 litres. With a yearly operation time of about 2'500 hours for each of the 6 fork-lift trucks, a total of 9'000 litres of diesel fuel are saved each year.
- The new route for the internal logistics is about 10% shorter. As a result, about 4'000 fork-lift truck kilometres are saved each year. At an average speed of 10 km/hr this equals 400 operating hours or about 1'000 litres of diesel fuel.

#### COSTS

The cost for the special fork-lift truck was about 10% higher than the costs for comparable machines. Company employees examined the internal routes without the help of consultants.

#### BENEFITS FOR THE COMPANY

With the changing of the internal routes and the purchase of new lift trucks, about 10'000 litres of diesel are saved each year. As the cost per litre is EUR 0.53, this means a savings of EUR 530 each year. More valuable for the company are the savings in man power by the change of the internal routes, which saved circa 400 operating hours.

#### OUTLOOK

For the past two years, Duijghuijzen has been negotiating with the local authorities about expanding the company site. This would allow them to completely reorganize their internal logistics and increase their efficiency.



## Reduction of Empty Kilometres

Several measures were implemented to improve the efficiency of the trucks from Duijghuijzen:

- Introduction of an "early-morning" distribution system.
- The recording of loaded and empty kilometres by onboard computers.
- Employing route optimisation software.



The "early-morning" distribution system is aimed at avoiding traffic jams and optimising the utilisation of the trucks by using the same number of trucks for more trips. The main idea is to deliver the goods to the customers, which are often property markets, very early in the morning (around 5 or 6 o'clock), long before normal opening hours. By doing so, heavy vehicles traffic and rush hour traffic is separated. Apart from avoiding traffic jams, this separation also results in better traffic safety for all participants. Duijghuijzen did not encounter problems implementing this system with their own drivers or with the employees of their customers.

#### BENEFITS FOR THE ENVIRONMENT

- The introduction of the "early-morning" distribution system led to a reduction in the number of kilometres driven by circa 1% or about 25'000 km per year.
- The recording of the loading and empty kilometres using onboard computers resulted in a reduction of empty kilometres by 5%. Over a span of three years, Duijghuijzen's entire truck fleet saved about 125'000 empty kilometres.
- The efficiency of the distribution system improved by circa 5% (or 120'000 less kilometres) through the use of route optimisation software.
- As a result of the above-mentioned measures, only 8% of all driven kilometres were empty kilometres. Despite the growth of the company and the enlargement of the truck fleet by 25% in the past three years, the absolute number of empty kilometres is even lower than three years before.





In order to optimise truck utilisation, it is necessary to know exactly which trips are loaded and which are empty. Only when this data is available, can measures be taken to minimise the empty kilometres of the trucks. For this reason, Duijghuijzen implemented onboard computers that were later equipped with GPS systems.



#### BENEFITS FOR THE COMPANY

The benefits for the company are higher productivity of the trucks and a reduction in empty kilometres. By avoiding traffic jams, the drivers are more productive in terms of kilometres driven per hour and fewer detour kilometres.

The GPS system installed in the trucks gives the company the possibility of determining the exact location of the truck at any time of the day and, thus, the ability of reacting in almost "real time".

#### COSTS

The costs for the onboard computers were about EUR 1'150 for each truck. The route optimisation software was about EUR 2'500.



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## Manoeuvrable City Trailer with Increased Capacity for Tank Transport

The "City trailer" is a semi trailer that combines a high load capacity with the ability to being easily manoeuvred through very narrow passages in cities, making it ideal for petrol and diesel distribution transports both to petrol stations and for domestic use. It is the only one of its kind in Scandinavia, and maybe in the whole of Europe.



#### FRYDENLUND TRANSPORT A/S

N

The company was founded in 1963 by the father of the present owner. The company carries petroleum products for Statoil Norge A/S in eastern and southern Norway.

Frydenlund Transport operates 6 tank vehicles, has 14 employees and is situated at Kloefta, close to Oslo. The company has been certified according to ISO 14001 and ISO 9002. As a result of a new policy for the purchase of transport services in Statoil Norge AS, Frydenlund Transport A/S entered into a strategic co-operation with Nilsen og Kokkersvold A/S, so that they both now cover the whole of southern Norway for Statoil Norge AS. The company annually makes 4'940 deliveries with 133.5 million litres petroleum products.

It is a policy of Statoil to have close control of a great part of its transport activities, including driving plans etc. In spite of such limitations, Mr Frydenlund identified the company's negative impact on the environment and developed a company policy for sustainable transport, the objective being a reduction of emissions of 2% by 2002.



Thanks to the unusually close contact and co-operation with Norsk Scania AS, Mr. Frydenlund had earlier been able to initiate and follow up the development of a 4-axle vehicle for tank transport, increasing the capacity from 19'000 litres to 26'000 litres. This kind of vehicle is not unusual on European roads but it has been universally deemed unsuitable for Norway because of tough winter conditions. When this proved to be a success, Mr. Frydenlund began to work with the idea of a new concept; a vehicle that could carry more fuel per trip and at the same time be ideally suited for city transport. After one year of development, the result was "City Trailer" built in Denmark.





The semi trailer is coupled to a EURO 3 powered Scania P124L 4x2 with the low cab. Due to aluminium as the predominant construction material, the trailer net weight is 6'500 kilos, with a payload of 25'700 kilos. The goods capacity is 34'000 litres of fuel. The whole semi trailer set has a gross weight of 39 tons. The truck's special construction led to the choice of a hydraulic steering system. When manoeuvring in extra narrow passages and at very low speed, the driver can control the hydraulic steering by means of a joystick from the cab.

This is a new concept in Norway. To ensure the loyalty of his employees, the intended driver of the new vehicle was included in the planning and development work and has contributed with solutions to practical problems.



#### COSTS

The vehicle cost NOK 2 million (EUR 270'000), not including development costs. Frydenlund Transport's contribution to the development process has been several trips to Denmark, plus an unspecified number of working hours by the company owner.

#### BENEFITS FOR THE COMPANY

The reduction of trips makes the services of Frydenlund less costly for the shipper Statoil Norge AS. This might be seen as a disadvantage for the transport company. However, by proving to Statoil that Frydenlund is continually striving to offer the best and most cost-effective transport solutions, it is creating a win-win situation and thus cementing the good relationship between transport buyer and provider. An additional bonus is that the driver's involvement in the process has worked as a strong motivating factor for the driver.



The vehicle has been in normal every-day use since July 2002. To ensure optimal utilization, it is vitally important that the City Trailer is put to its proper use; distribution in cities. Furthermore, the driving plans have to correspond with the vehicle's special features.

#### BENEFITS FOR THE ENVIRONMENT

Annually, the company transports roughly the same volume of petrol products as before with 2/3 of the trips. This leads to reduced fuel consumption and emissions. In addition, the change from EURO 0 to EURO 3 has also made a significant difference.

#### OUTLOOK

The objective of Frydenlund Transport A/S is to further reduce emissions by 2% until 2004. The company systematically monitors the fuel consumption and emission performance of its vehicles.

Future improvements will be gained by:

- Further improving City Truck's operation



by more "tailor-made" driving plans.

- Continuous updating of vehicle fleet.
- Training the drivers, with main focus on defensive and more fuel effective driving.
- Taking into account the possibilities for recovery of waste materials when purchasing technical equipment.
- Promoting the concept to petrol stations as a new tool for bettering their capacity.
- When improvements to vehicles are made, ergonomic factors, influencing the driver's health and comfort shall also be taken into account.



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# Optimisation of Utilisation Rate by Rearranging Vehicle Combinations

## GRANSJÖNS

### GRANSJÖNS TRAFIK AB



Gransjöns Trafik AB started in 1993 as a partnership. Today, it is operated as limited company. The company carries out national and international transport in cooperation with Schenker as its main customer on the lines from Norrland to Oslo, Småland to Oslo, and South Norway to Denmark and the rest of Europe. Its offices, with garage and warehouse, are situated in Svanskog in southern Värmland.

The number of employees in the haulage firm is 19. Gransjöns Trafik has ten trucks, six semi-trailer tractors, ten semi-trailers, nine trailers and delivery vehicles.

In 2001, the company's turnover was SEK 18 million (EUR 1.97 million). The estimated turnover for 2002 is SEK 25 million (EUR 2.74 million).



journeys between Umeå and Svanskog could be carried out with a 25.25 m tractor semi-trailer unit (see map on next page showing "Umeå-Oslo Route"). This combination consists of a truck with 7.82 m platform and a 13.6 m trailer. In Svanskog, the combination was rearranged into an articulate truck with a semi-trailer (totalling 16.5 m) and a truck coupled to a short trailer with other goods for transport onward to Oslo (see diagram "Rearrangement procedure near the border").

On the back journey, the combination is rearranged again. The short trailer stops in Svanskog with cargo to Umeå or other places. The containing cargo is transhipped to other vehicles. For the likely longer transport distance in Sweden, it was now possible for three short combinations to be replaced by two long ones (see map below showing the "Umeå-Oslo Route").



Map showing the "Umeå-Oslo Route"



### COSTS

The implementation of new vehicle combinations meant no additional expenses for Gransjöns Trafik. The initial costs for the new vehicles are the same as for conventional vehicles.

### BENEFITS FOR THE ENVIRONMENT

The rearrangement of vehicle combinations realised an annual reduction in driving distance of 200'000 km. At an average fuel consumption of 42 litres per 100 km, that means that 84'000 litres of diesel could be saved, as well as 20 sets of tyres, lubricants etc. Since this tractor and semi-trailer unit is also equipped with a particle filter, the environmental gains are impressive to say the least.



CRT filtre which reduces hydrocarbon and particle emissions by 80-90%

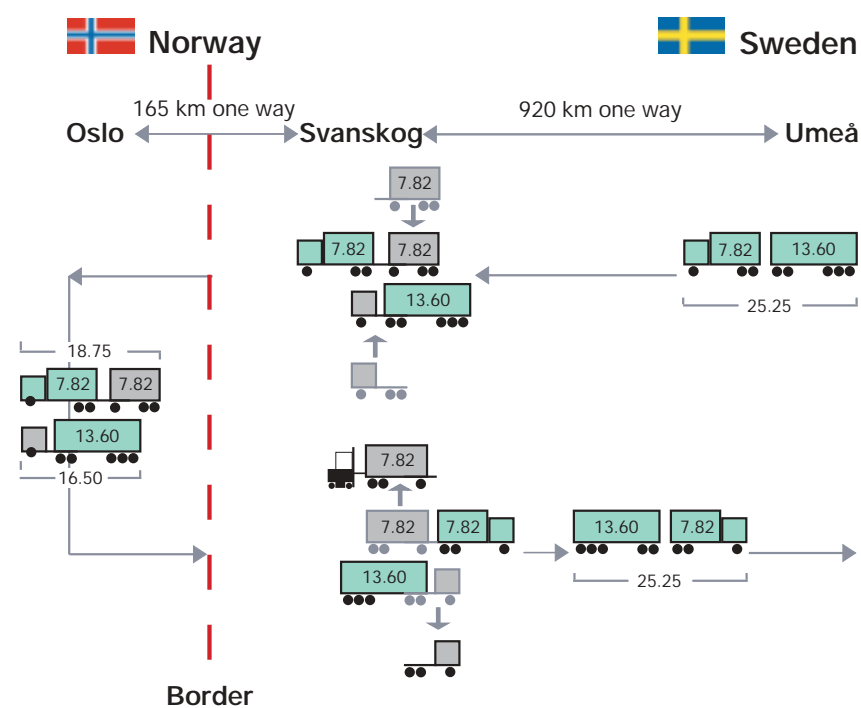




## BENEFITS FOR THE COMPANY

Gransjöns' introduction of the new transport arrangement saved costs for fuel, tyres, lubricants etc. The reduction of 2'800 working hours led to additional savings for Gransjöns Trafik. The new transport arrangement has aroused great interest and reinforced already established contacts with customers.

## Rearrangement procedure near the border



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## Zero Emissions Using a Fuel Cell-Powered Vehicle



KG HERMES VERSAND SERVICE  
GmbH & Co

D

Hermes Versand Service was established in 1972 by the mail-order house Otto Versand. In 2002, it had 12'000 employees and generated revenues of EUR 415 million. In the same year, the company delivered 175 million shipments using 1'500 of its own vans and 1'500 leased vans. The company operates four distribution centres in Germany that support 65 depots, 8'000 package shops, and 600 bases. Hermes Versand Service is a private delivery service with a wide range of services that distributes area-wide consignments in the B2C segment. The Hermes Group is also registered to ISO 14001.

With the help of DaimlerChrysler AG, the Mercedes Sprinter was put into operation at Hermes Versand Service within the framework of the company-wide environmental management system. The impetus to promote environmentally friendly technologies in the commercial vehicle sector came from the management level of Hermes Versand Service. The fuel cell-powered



vehicle was first put into operation in the summer of 2001. In the first year of its operation, the Sprinter ran up more than 16'000 kilometers in service. The vehicle operates on compressed hydrogen, has a range of 120





to 150 kilometers, and is optimally designed for the requirements of daily delivery work. The fuel cell system is located under the floor of the vehicle so that it does not restrict cargo space. The hydrogen is carried in six pressurized tanks. The vehicle's top speed is 120 km/h and the synchronous electric motor with front-wheel drive has an output of 55 kw. The Hermes Versand Service also tested alternative drive systems such as electric and gas delivery vehicles.

#### COSTS

The company-wide environmental management system costs ca. EUR 50'000 per year.

The company had to make a one-time investment of EUR 250'000 to put the fuel cell-powered vehicle into operation.

#### BENEFITS FOR THE ENVIRONMENT

The use of fuel cell technology in the delivery vehicles resulted in zero emissions. The Sprinter is a genuine zero-emission vehicle that uses hydrogen instead of fossil fuels. There are no ecologically harmful waste products with carbon compounds: only water comes out of the exhaust pipe. Furthermore, the fuel cell drive is extraordinarily quiet and twice as efficient as conventional gasoline engine technology.



#### BENEFITS FOR THE COMPANY

The use of innovative, environmentally friendly technology increases the environmental awareness of its employees and improves its environmental image.

In addition to this, Hermes Versand Services hopes to gain a technical head start on their competitors by being the first to use vehicles with modern fuel cell technology.

Last but not least the company feels responsible for the promotion of environmental friendly technologies for the society's benefit.

#### OUTLOOK

- Continuation of their environmental activities and their environmental controlling.
- Expansion of environmental activities to include their service partners.
- Optimization of waste management.
- Reduction in the consumption of energy and water.
- Optimization of the "long trips" between the client and the depot.



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# Driver Training and Testing



LULEFRAKT AB



Lulefrakt represents a group of 75 haulage companies as shareholders operating a limited company. The main activity of the group is the sale of transport and contracting services. The company has a goods terminal for chilled, frozen, and loose goods, a concrete mixing plant, and a truck garage. On a contract basis, Lulefrakt also operates a crushing plant and briquette factory on the premises of Swedish Steel, which generates freight consignments for the company.

The administration comprises 30 staff members. The haulage companies, with their owners and employees, total circa 250 staff. The fleet comprises 190 articulated vehicles and semi-trailer units and seven loaders. Lulefrakt had a turnover of SEK 189 million (EUR 20.7 million) in 1996. In 2001, it has increased to SEK 300 million (EUR 32.9 million). The transport service totalled 13 million kilometres or one trip around the earth every workday.

Lulefrakt is certified in accordance with ISO 14001 and ISO 9002 and incorporated "helgrön kvalitet" in its logo. It represents "Green Quality" or "Green Environment".

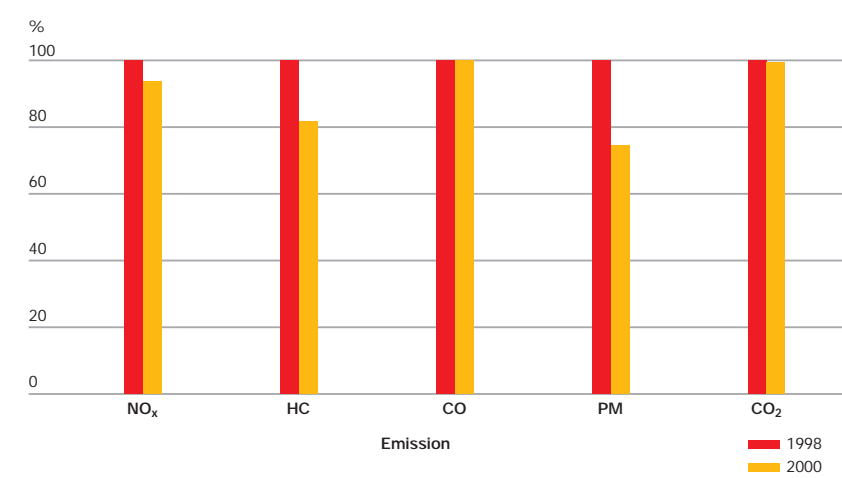
The company is aware that the average age of drivers is increasing. Therefore, the company is participating in driver training at Boden and Piteå driving schools. The goals of driver training are to further the education of drivers and to show the drivers how to share their own knowledge and experience with other drivers and help pass on road safety and environmental knowledge in connection with transport. In December 2000, the board of Lulefrakt adopted a road safety policy. This policy is based on principles such as the following:

- The transport of goods has to conform to the rules and regulations (for example, driving and rest times).
- All vehicles have to undergo a voluntary extra brake check every 6 months, carried out by a vehicle-testing agency.
- Drivers must employ the hands-free function if they use mobile phones while driving.

Driver training is organised in groups of different size. The training in economic driving ("Heavy Eco-Driving") is performed practically and by videotape. "Heavy Eco-Driving" means to drive safely and in an economical manner to reduce fuel consumption and environmental impact.



Exhaust emissions – 1998 vs. 2000



## COSTS

At present, the cost is SEK 3'000 (EUR 329) per driver.

## BENEFITS FOR THE ENVIRONMENT

- Lower emissions as a result of less fuel consumption.
- More vehicles, more kilometres, and less emissions (see graph: Exhaust emissions 1998 vs. 2000).

## BENEFITS FOR THE COMPANY

- It will help the company to reach its primary environmental goal: to reduce exhaust emissions.
- Lulefrakt's gains the image of a forward-thinking company.



## Avoiding Empty Trips

Lulefrakt owns 25% of the timber haulage group of Trätransporter i Norrbotten AB (TräTrans). The business idea underlying the firm is to negotiate with transport purchasers on behalf of the shareholders and to coordinate and optimise transport processes.

TräTrans is also responsible for trying to avoid empty trips. They reached this goal by increasing the proportion of return cargo. Since TräTrans transports round timber, wood chips, and sawn timber, it is possible to organise return freight, particularly for wood chippings. In 1994, the first steps were taken to organise return cargo. Since then, the ratio has increased constantly.

TräTrans is able to organise return cargo because it transports high volumes of cargo for many of its customers and, thus, has deep market penetration. A constantly updated Internet platform is used to organize the cargo for return trips.

### BENEFITS FOR THE ENVIRONMENT

The number of kilometres of return load in 1999, 979'000 km, corresponds to 15'468 kg of nitrogen oxide, 1'958 kg of carbon monoxide, 979 kg of hydrocarbons, and 1'306'965 kg of CO<sub>2</sub>. These kilometres would have been driven empty before the measure was implemented.

### COSTS

This measure has not resulted in any separate costs.

### BENEFITS FOR THE COMPANY

Because each transport order states a specific number of kilometres, it is possible to carry out separate accounting for return cargo. In 1999, this amounted to 979'000 km as compared with 132'000 km in 1994. Since the economic gains of return freight have been accounted for separately and allocated fairly between transporters and customers, the partners now have a lot of confidence in TräTrans.



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## Implementation of an Environmental Management System (EMS)

By implementing an EMS, Marqueset hoped to:

- Make its employees more aware of environmental issues.
- Reduce the utilisation of natural resources.
- Prevent contamination.
- Appropriate actions concerning generated hazardous waste.
- Demonstrate that transport can be ecological.

The entire staff was involved in implementing the EMS, including the administration, garages, warehouses, and drivers. Along with legislation and other environmental requirements, the specific processes of the EMS include managing and utilising natural resources and managing waste. The more general processes deal with training the employees, internal



TRANSPORTES INTERNACIONALES  
MARQUSET, S.A.



Transportes Marqueset's main field of activity is international road transport. They also offer air and maritime transport. The market covers a broad variety of industries, such as automotive, ceramics, food, and general cargo. The company is located in the province of Valencia in Spain, with local offices in Madrid, Irún, Barcelona and Tarragona.

The current number of employees is 204; a number that has increased by 10% over the past three years. They employ 91 drivers. The fleet consists of 11 trucks, 56 semi-trailer tractors, and 97 semi-trailers. The transport volume rose from 244'420 tons in 1998 to 286'375 tons in 1999 and to 345'876 tons in the year 2000. Transportes Marqueset's turnover in 2000 reached circa EUR 47 million.

Transportes Marqueset has been certified in accordance with ISO 9002 since 1998. Marqueset is only the second Spanish company in the transport sector to have a certified Environmental Management System. The certification was approved in November 1999 by AENOR in accordance with the ISO 14001 norm.







and external communication, public relations, and responsibilities inside the company. The key steps in implementing the system were:

- Evaluating the company to analyse the current situation with respect to environmental matters.
- Designing and elaborating the processes.
- Evaluating the environmental aspects and impacts of the development of the company's activity.
- Implementing the EMS: training the employees and integrating the processes defined by the EMS into daily work.
- Having the EMS certified by AENOR.

The decisive factors for the success of the implementation were the attitude of all employees and, especially, the professionalism of the head of the garage, who is most directly involved in the production and control of the residua. One of the major obstacles in the beginning was a lack of knowledge in the public administration, resulting in the administration not being able to give firm answers to question formulated by Marqueset. This was due to the leading role of Marqueset in implementing an EMS in the transport sector. Today a good co-operation exists.

In the introduction phase, Marqueset counted on the help of the foundation CETMO (Confederación Española de Transporte de Mercancías, Spanish transport association), who encouraged the company to start with the EMS. In a later phase, the consultancy company Norcontrol provided support to Marqueset with



COSTS

The costs for the implementation of the EMS were as follows:

- Consultancy: EUR 15'000
- Various measurements and analysis: EUR 3'000
- Internal and external audits: EUR 4'200
- Operating costs: EUR 4'500
- Documentation costs: EUR 3'600

The costs for the various other measures described above were for the installation of:

- A water meter in the cleaning station: EUR 600
- A wash water recycling system: EUR 4'200
- Metallic vats: EUR 900
- A warehouse for chemicals: EUR 3'000

BENEFITS FOR THE ENVIRONMENT

Through the installation of a wash water recycling system, a 35% reduction in water consumption was realised. The measurements with the water meter show that now about 500 litres of water are necessary for washing a truck. Before the recycling system was installed, about 800 litres were needed to wash a truck.

The replacement of mineral oil by synthetic oil has reduced the generation of used oil by about 70%.



designing and elaborating the processes, evaluating the environmental impact of the activities, and preparing the external audit.

The initial evaluation and analysis of the results took about six months and was completed in July 1998. After that, it took about 16 month until the certification in November 1999, thus the whole implementation process was completed in less than 2 years.

BENEFITS FOR THE COMPANY

By replacing the oil used in the trucks, the waiting time of the vehicles in the garage as well as the garage time for changing oil has been reduced.

As well, water costs were reduced by the installation of the recycling system.

Furthermore, an exhaustive control of the costs of residue management has been achieved. This is an advantage for Marqueset in negotiations with companies who take over the residue. The costs

for residue disposal have decreased by circa 10% since the introduction of the EMS. Apart from these direct benefits, the implementation of the EMS also guarantees that the activities of Marqueset comply with all legal requirements and, thus, they will not have to pay penalties for accidents such as spillages.



The implementation of the EMS is still an ongoing process as each year the management establishes new environmental goals that are evaluated periodically. Also, AENOR performs annual follow-up audits in order to monitor the level of implementation and accomplishment of the EMS.



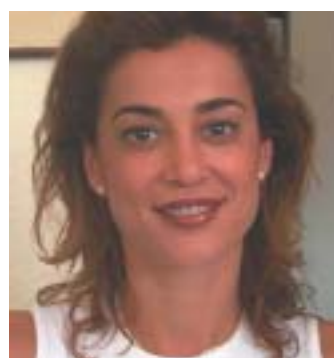
The following measures have been carried out in the last few years:

- Installation of a wash water recycling system and a water meter in the truck cleaning station.
- Replacement of mineral oil by synthetic oil.
- Installation of metallic vats in the warehouse to be used for dangerous residues.
- Construction of a warehouse that can handle chemicals.
- Simulation of fires and other emergencies.
- Annual approval of a training plan to provide the employees with all necessary information and knowledge to comply with the EMS.



#### OUTLOOK

Marqueset is leading the way for other Spanish companies and helping some implement their own EMS.



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## Precise Renewing of the Vehicle Fleet



#### NILSEN OG KOKKERSVOLD AS



Founded in 1958 as a family company, Nilsen og Kokkersvold AS is now a limited company owned by the same family with Audun Nilsen as managing director. The company operates 7 tank vehicles and employs 12 persons. Although small, the company has one person responsible for quality and environmental issues. The company has been certified according to ISO14001 and ISO 9002.

Nilsen og Kokkersvold transports 150 million litres petroleum products for Statoil Norge AS annually. This results in 4'500 loads and some 8'000 deliveries or 755'000 kilometres per year.

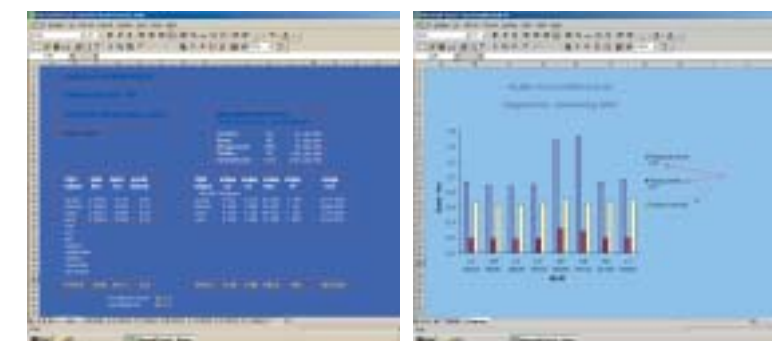
The fact that the customer Statoil Norge AS requires strict control of certain activities including driving plans, leads to a situation where Nilsen og Kokkersvold has to analyse and find other areas where the company can achieve benefits for the environment.

For a small company, it is particularly important to define clear goals and to identify different fields of action that combined can give good results. The company has put focus on exhaust emissions. Therefore, in 1999, it has set the goal to reduce emissions by 2% until 2002.

Earlier, the decision about which vehicle should be replaced was based on general know-how, economy and the wishes of the drivers. In order to reduce emissions, it would be correct to change e.g. an old EURO 0 truck for a new EURO 3. However, Nilsen og Kokkersvold has now developed its own data application to determine which vehicle should be replaced.



Extensive information about each vehicle is collected in order to find out the right replacement for achieving maximum emission reduction for the whole fleet. This can, for example, lead to keeping an old EURO 1 vehicle, because its annual driving distance is little or because it is used for lighter tasks. Instead, a newer EURO 2 vehicle is exchanged with an EURO 3. The wishes of individual drivers will not carry much weight anymore.



Screenshots from Nilsen's PC environment management programme



**COSTS**

Development-costs have been very low, because the Managing Director himself has developed the data application. External consultants from truck dealers and from the national association have supported Nilsen og Kokkersvold, in both cases without cost.

- The ISO certifications are implemented in the company's daily routines and its cost cannot be estimated separately.
- Labour cost for one person for one year

covers the cost of adjusting the management system to meet the requirements of ISO 9002 and ISO 14001.

**BENEFITS FOR THE COMPANY**

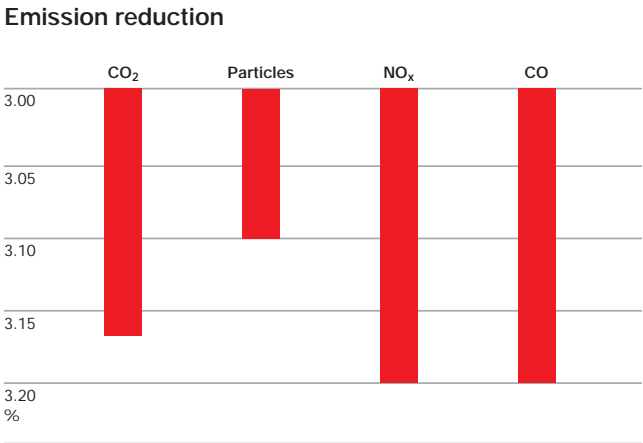
- Fuel costs reduced according to reduction in fuel consumption.
- Increased utilization rate, as measured in load capacity and operational hours are easily monitored.
- A high standard of maintenance of vehicles and other equipment leads to cost efficiency.



**BENEFITS FOR THE ENVIRONMENT**

**An example:**

In 2001, a Volvo F16 was exchanged for the smaller, but more efficient FH12 truck. This led to a reduction in fuel consumption of 0.123 litres/km. At the same time, the tank equipment was rebuilt, so that the load capacity was increased from 44 to 46 m³. This led to an increased loading from 40'000 litres to 43'000 litres or 7.5% increase. Despite this increase, the vehicle's fuel consumption was reduced from 2.61 litres/km to 2.56 litres/km or 4.63%.



# Driver Training for more Fuel-Efficient Driving

The programme for driver training was launched in 1998/99. It focuses on all work operations, such as safe and fuel-efficient driving, minimizing or eliminating the danger of oil-spillage, overfilling, faulty filling etc. at delivery places. The driver training is carried out in cooperation with truck-dealers and Statoil Norge AS. Each newly employed driver goes through this programme, including routines for cleaning, testing and daily maintenance.

It is difficult to achieve a continuous and significant reduction in fuel consumption in Norway due to its topography and great differences between summer and winter. Accumulated snow and ice on a vehicle can, for example, produce up to 1'000 kilograms increase of weight, with a subsequent increase in fuel consumption. This is the reason for focusing on cleaning the vehicles and to suit the style of driving to road conditions.



**COSTS**

Through cooperation with truck dealers and the customer, training costs have been low. The cost of training a newly employed driver is stipulated to NOK 30'000 (EUR 3'950).

**BENEFITS FOR THE ENVIRONMENT**

- Reduction of oil spillage and damages.
- Reduction of exhaust emissions.
- Proper handling of wastewater and cleaning liquids when cleaning vehicles.



To achieve good results, it is very important that the drivers participate, so that they have a sense of “ownership” to this improvement-project. Another critical success factor is to have frequent direct contact with each driver as part of the loyalty building and in order to create a sense of being part of a team. This has so far eliminated the need for special incentives.

Before, the company often hired subcontractors in periods of intense activity. However, analyses have shown, that these temporary employed drivers were less effective and caused more damages, oil spillages etc. as well as higher fuel consumption. To avoid this, the company decided to hire a driver on a permanent basis.



#### BENEFITS FOR THE COMPANY

- Building-up of goodwill at delivery places and with customers.
- Reduction of fuel consumption.
- Stronger team consciousness and loyalty among drivers.



#### OUTLOOK

This company will soon have reached the optimal reduction in emissions under the Norwegian conditions of climate, topography and operations. Future reductions in emissions depend on the technical development of truck engines and the continued emphasis on driver training.

Therefore, the management will redefine the company's environmental impact and its possible ways of improving operations. Based on this, they will decide on a new goal that will be described in exact terms.



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## Sustainable Services: Use of Environmental Friendly Refrigerants

When W. Schüssler Spedition GmbH talks about sustainable services, they mean that they offer services for temperature-controlled goods that use very little resources and avoid waste. They are continually improving their processes by working closely with refrigerated warehouse suppliers and manufacturers of refrigeration machines and systems. One of their most important goals was to minimize energy consumption in their refrigerated warehouses. They were able to do this by using the following:

- A computer-controlled system.
- Superior insulation.
- Additional insulation for the loading areas and high-speed doors to minimise the loss of cold air.
- Stacker trucks that utilise energy recovery.



W. SCHÜSSLER SPEDITION GmbH



W. Schüssler Spedition GmbH was founded in 1950 and moved to its new location in Heppenheim in 1983. Today, their 21'000 m<sup>2</sup> industrial premises include a gas station, a service garage, refrigerated warehouses, a car-wash plant, and offices. They have branch offices in South Hessen, Sachsen, and Luxembourg; and they have several partners throughout Germany.

The company has 60 staff members, including 40 drivers. Their vehicle fleet consists of 20 large refrigerated trucks and 8 light vehicles. All vehicles are equipped with a GSM telephone.

The main focus of the company is on the national distribution of temperature-controlled goods (usually food products). An average of 1'000 Euro pallets are transported every day. The refrigerated warehouses have 3'200 shelf storage spaces for refrigerated goods and 1'000 spaces for fresh produce. The group's annual turnover is circa EUR 10 million.







#### COSTS

The external costs amounted to EUR 7 000 and included personnel expenses, disposal costs for the old freezing agents (cryogen R 502), and the costs for the new environmentally friendly CFC-free freezing agents (R 404A /134A).

#### BENEFITS FOR THE ENVIRONMENT

Air pollution was avoided and the burden on the ozone was reduced through the use of CFC-free freezing agents.



In 1999, they decided to reduce the burden on the ozone by replacing harmful refrigerant, containing chlorofluorocarbons (CFC), with environmentally friendly freezing agents. It only took them 18 days to replace all of the harmful refrigerant in the cooling systems of the refrigerated warehouse and vehicles. The following points played a decisive role in the replacement of the refrigerant:

- The plan to keep the older warehouse empty for a short period of time.
- The precise timing of the replacement of the new machines in connection with the extension of the ATP certification for the vehicle cooling systems.

#### BENEFITS FOR THE COMPANY

The well-organised processes and the use of modern technology increased the motivation of the employees. The improved motivation of the employees and the noticeably increased self-esteem leads to a better working environment and helps improve the image of the company in the eyes of its business partners and customers. This is very important for a company whose main focus is the transport of food products.



#### OUTLOOK

The company is considering the use of solar energy for operating the refrigerated warehouses in the future.



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# Driver Training for Safe and Fuel-Efficient Driving

One of their main business goals is a steady reduction in fuel consumption. The yardstick is a yearly improvement of 2%. The management handbook specifies different measures for measuring, reducing, and improving this process.



SETZ GÜTERTRANSPORT AG



The motto of Setz Gütertransport AG in Dintikon is "Growing with people while remaining human." According to a study carried out in 2000, Setz is ranked as the second best company to work for in Switzerland. It was founded in 1911 as a trading company for farm products.

Today, their ca. 700 staff members, the so-called "Setzlinge" (seedlings), provide complete distribution solutions from goods transport to warehouse management, including additional services such as labelling, shrink-wrapping, pricing, and handling customs. Setz focuses on five strategic sectors of the market: office automation, entertainment electronics, information technology, sports and hobbies as well as pharma and health.

Quality assurance and environmental protection are a key part of their business strategy and are the anchors of their operational processes. Since 1992, their management system has been certified according to ISO 9001/14001.



The fuel consumption of each vehicle is determined every month and analysed by a software programme. The drivers who have the ten worst results are spoken to and assessed. The following measures are used to correct the problem:

- The route plan is altered.
- The driver receives training from an external driving instructor.
- The vehicle is inspected in the garage.



The implemented measures and their results are recorded in a log. The following additional measures are also used to support the procedure:

- Annual driver training.
- Driver training using a simulator.
- The driving behaviour is monitored by an internal driver instructor.

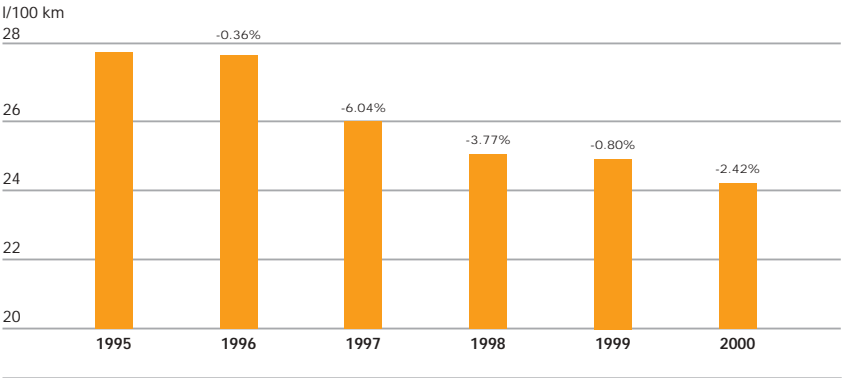


COSTS

The costs for training, consulting fees, and internal services (for example, investment and personnel) amount to approximately CHF 50'000 (EUR 34'000) per year.



Annual fuel reduction





# Environmental Management System

Driver training and the monitoring of fuel consumption will continue to be implemented in order to maintain or improve the driving skills of the drivers.



## BENEFITS FOR THE ENVIRONMENT

Protecting resources: fuel consumption is reduced by an average of 2.4% per year (1995-2000).

Emissions: reduction in CO<sub>2</sub> emissions proportional to fuel consumption, reduction in the emission of NO<sub>x</sub>, CO, HC, and particles.

## BENEFITS FOR THE COMPANY

In 2000, the company saved 74'225 litres in fuel. This resulted in a savings of CHF 115'280 (EUR 76'000).



SIMSSEE-TRANSPORT GmbH

D

Founded in 1936, Simssee-Transport GmbH is a medium-sized enterprise with 21 employees and a total annual turnover of circa EUR 2 million.

The company specialises in Alp-crossing transport between Germany and Italy.

The market segment consists of goods with high logistical requirements. Their headquarters are in Unterschlofen with a warehouse and truck fleet; the administrative centre is situated in Prien am Chiemsee. The company fleet includes nine swap body trucks, 2 tractor units with container chassis, and about 80 swap bodies.

Depots for the swap bodies are situated in Munich, Augsburg, Schongau, Verona and Milano. In 2002, the transport figures amounted to 50'000 tonnes.

The partner Karl Fischer received the award for Logistics and Environment in Germany in 2000 and was winner of the ADAC (General German Automobile Association) mobility award in 2001.



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Their environmental management system is in accordance with regulation 1836/93 (EWG) and is characterized by environmentally oriented company management. Within the scope of this regulation, all competences and processes are controlled and documented. Environmental policies, goals, and programs were elaborated in workshops involving management,



employees, and external consultants. This environmental management system will be developed further in 2002 according to regulations EMAS II. The goals and measures are as follows:

- Reduction of resource consumption (diesel fuel, oil, cleaning agents, electric power, and water) and pollutant emissions.
- Increase in the percentage of combined transport: to reach this goal efforts were made to reduce transport time in transports Munich – Verona from twelve to six hours. This was done in the scope of a project with the following partners: DB AG, FS, ÖBB, ÖKOMBI, CEMAT, KOMBI-VERKEHR, Fraunhofer Institute for Material Flow and Logistics, and Rosenheim University of applied sciences. Measures were taken to increase utilisation of railway



resources like wagons and locomotives and to reduce utilisation of swap bodies (-20%). A pilot train has been established in the meantime, which shifted approx. 13'000 trucks within half a year from road to rail.

- A minimum 5% reduction in empty trips through the use of telematics.
- Reduction in emissions caused by accidents: the single measures are reduction of the stored volume, optimisation of consumptions, emergency planning and acquisition of a new double-wall oil tank with 1'500 l.
- Pick-up and delivery times that are convenient to the residents.
- Open communication with interested groups and public relations; for example, the regular submission of articles to newspapers and specialised press.

The company is working on a continuous improvement process (the Kaizen principle) and adapting their activities to the current technical and organisational resources. They have achieved their aims and even exceeded some of them. SVG München prepared them for the environmental audit 1836/93, with the goal of achieving the status of a disposal company and obtaining the Bavarian environmental pact, of which the company was cosignatory.



#### COSTS

The total investment in environment protection amounts to circa EUR 30'000.

#### BENEFITS FOR THE ENVIRONMENT

- Different measures have resulted in approximately 15% less waste each year over a longer period of time. Nowadays total waste production has reached a very low level, therefore a further reduction seems hard to achieve.
- Replacement of road traffic by inter-modal transport in the highly sensitive Alpine region.

#### BENEFITS FOR THE COMPANY

- Positive company image and well-recognized company name (originated by numerous articles in technical literature and trade journals).

#### OUTLOOK

The company plans to use telematics to improve the coordination of material and information flows and optimise their entire transport process.

## Use of Low-Emission and Low-Noise Vehicles

Already in 1989, the first low-emission and low-noise vehicles (becoming EURO 1 in 1992) were used. Since 1999, EURO 3 vehicles have been in use. Against this background, Simssee-Transport GmbH achieves emissions far below the legal limits. For its continuous efforts for environment-friendly transports, the company received the European Environment Reward. Currently, they are trying to reduce the consumption of resources and the emissions of its truck fleet.

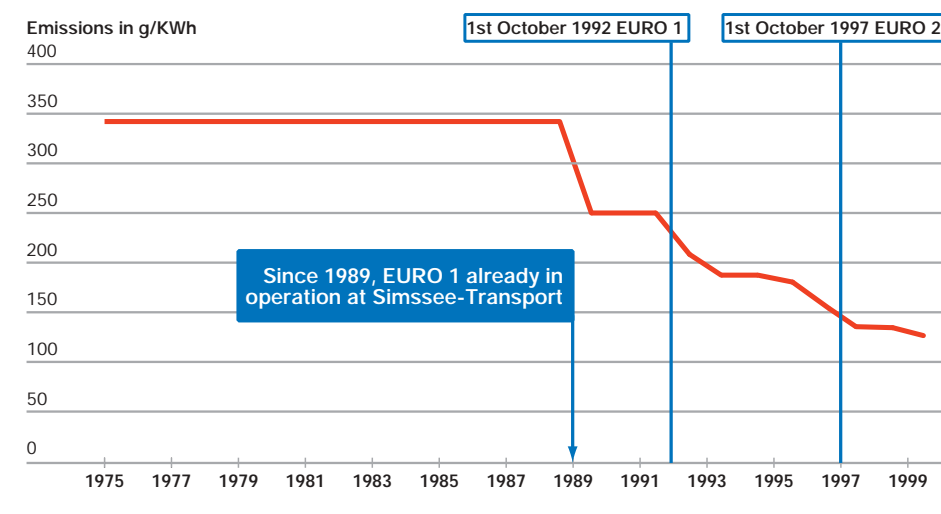
#### COSTS

The annual costs for driver-training and the participation in the Scania Development Commission arose to circa EUR 9'000.

#### BENEFITS FOR THE ENVIRONMENT

- Reduction in noise emissions from 91 dB(A) in 1970 to 80 dB(A) today.
- Reduction in vehicle emissions (1988: 336 g/KWh; 2001: 119 g/KWh).

#### Low-emissions vehicles from Simssee-Transport



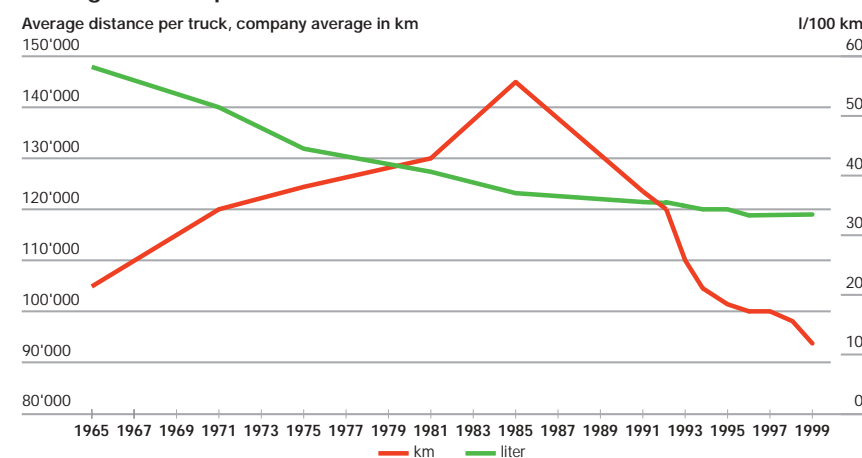


## Tyre Management Plan

The company has implemented the following measures:

- Ecological awareness training for each employee (2 days per year).
- Scania driver training for all employees.
- Use of the latest technology in order to reduce emissions, noise, and costs (modern truck fleets).
- Regular participation in the Scania Development Commission.

### Development of the fuel consumption Simssee-Transport. Average consumption of a 40-ton truck



### BENEFITS FOR THE COMPANY

- Reduction in the consumption of diesel fuel (1965: 57 l/100km; 2001: 32 l/100km).

### OUTLOOK

The company is striving towards maintaining a state-of-the-art truck fleet. Furthermore Simssee-Transport is testing new technologies for emission reduction, e.g. new lubricants for smoother operation and thus reduced fuel consumption.



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J. van der LUYT & ZONEN B.V.



Founded in 1907, the fourth generation of van der Luyt & Zonen provides national and international refrigerated transport from their home base Oegstgeest and the office in Basel, Switzerland. All types of perishable goods are transported throughout Switzerland and Great Britain, including flowers, plants, vegetables, fruit, and edibles.

The annual transport volume is circa 175'000 Europallets. This volume is handled by 90 employees and a fleet of 45 temperature-controlled road trains and semi-trailer trucks. The company facilities include a warehouse of 4'500 m<sup>2</sup>, 750 m<sup>2</sup> of cooling cells, a well-equipped maintenance unit (BOVAG certified), and a truck washing station.

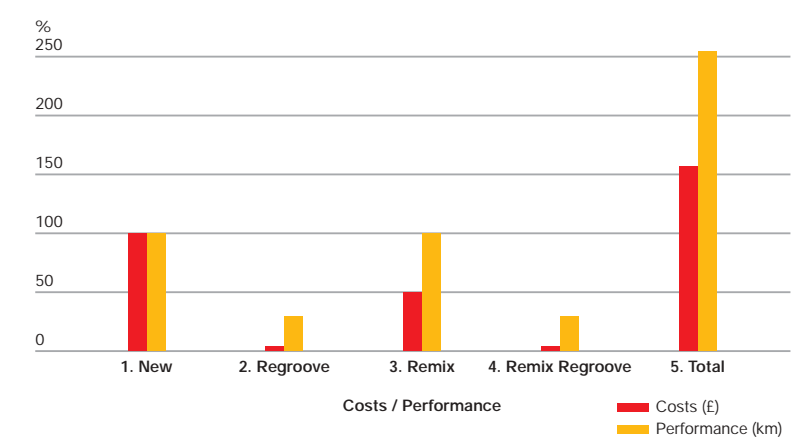
Van der Luyt is certified according to ISO 9001/2000 and HACCP (Hazard Analysis Critical Control Point, a systematic way of guaranteeing the safety of food). The total investment in environmental protection and safety is approximately 1% of the annual turnover.

Van der Luyt Transport's core business is transport. Michelin is a tyre specialist. This is why Van der Luyt Transport approached Michelin 5 years ago for a tyre management solution. The resulting tyre management plan is a tailor-made strategy for the carrier, describing how a transport company can make optimum use of Michelin tyres to attain the lowest cost per mile.



The plan is based on the fact that the casing of the tyres is strong enough to be used several times. Therefore, the Remix tyre (remoulded by Michelin) plays an essential role in realising the lowest possible cost per mile. In addition to this, both new tyres and Remix tyres can be regrooved, creating four lives for one tyre.

### Tyre Management Plan



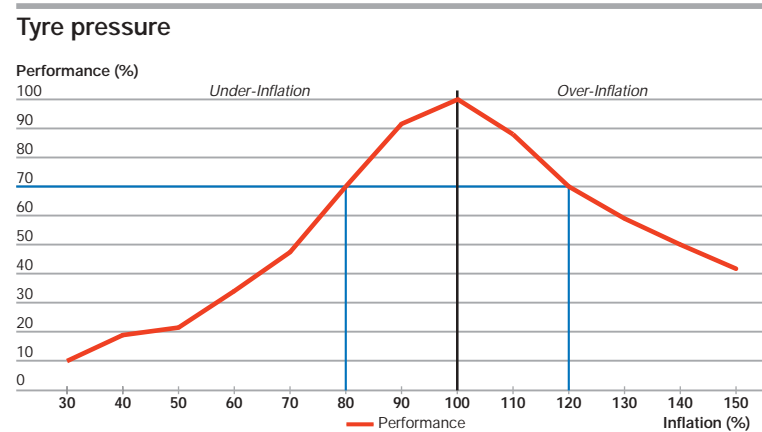


Michelin also provides recommendations for a tyre strategy for the whole fleet based on the operating circumstances of the carrier. The recommendations address the following points:

- Type of tyre to use.
- When to remove a tyre.
- Which tyres to regroove.
- Where to position the Remix tyres.
- Changeover tyres.
- Balancing tyres.
- Aligning vehicles.



These points are described per tractor unit and per trailer, per semi-trailer tractor and semi-trailer, whereby each position of the vehicle is handled separately. The description includes recommendations on pressure because the correct tyre pressure is very important for optimum mileage performance, wear and grip. As the following graph shows, over inflation or under inflation of the tyres result in performance loss.



#### COSTS

The personnel costs for training and education of the responsible person within van der Luit for the Tyre Management Plan are about EUR 2'500 a year.

#### BENEFITS FOR THE COMPANY

Van der Luit uses the Remix tyres, which cost less than new tyres, in as many positions as possible. They are very satisfied with the Remix tyres.

#### BENEFITS FOR THE ENVIRONMENT

- The utilisation of resources is minimised by extending the life span of tyres. This signifies an active contribution to sustainable development in road transport.
- Since adapting the tyre management plan for the new type of Michelin tyre, van der Luit has saved 5% in fuel.

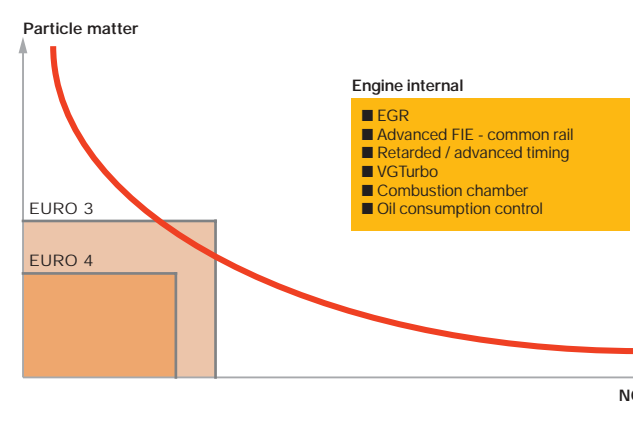


## Retrofit of a EURO 1 (EURO 2) Engine into a EURO 3 (EURO 4) Engine

Van der Luit feared that the introduction of the EURO 3 engine would result in higher fuel consumption, reduced lubrication intervals, and a reduced life span of the engines. At the same time, ultra low sulphur diesel fuel, with less than 10 ppm (parts per million), was and will be introduced in several countries in Europe, e.g. in Germany per 01.01.2003. Due to tax incentives, this happened far ahead of the originally foreseen date of 2005.



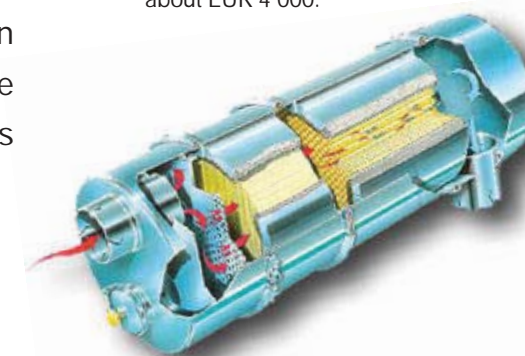
#### Particles NO<sub>x</sub> trade off



This offers the possibility of reducing the emissions of engines by using exhaust after-treatment in form of continuously regenerating particle filters, while optimising fuel consumption. The catalysts needed to this purpose used to be poisoned by the sulphur contained in the fuel. Meeting EURO 5 standard will only be possible with an exhaust after-treatment and/or exhaust gas recirculation (EGR) -system.

#### COSTS

The cost for installing a particle filter are about EUR 7'500 (handmade) for each truck. In production, the costs will drop to about EUR 4'000.



A cutaway diagram of the particle filter





Van der Luyt is working with Shell, Scania, Envirosafe and other specialists to determine the technical feasibility and cost of using a refurbished EURO 1 (EURO 2) engine in combination with Ultra Low Sulphur Diesel (10 ppm) in order to meet the EURO 3 (EURO 4) standard.



**BENEFITS FOR THE COMPANY**

A transport company as van der Luyt always strives towards achieving the lowest cost per kilometre, especially with respect to fuel consumption and maintenance, while respecting the mandatory emissions limits. Additionally, road taxes, as proposed or already in use in several European countries, often decline with lower emission levels, resulting in lower costs per kilometre.

**BENEFITS FOR THE ENVIRONMENT**

The emission levels for engines are presented in the table to the right. It shows that, especially for particles (PM), there is still a huge gap between the EURO 3 and the EURO 4 norm.

**OUTLOOK**

It is predicted that with the advent of EURO 4 engines and the availability of ultra low sulphur diesel, the trade-off between lower emissions and higher fuel consumption will finally be resolved.

By operating the engine at its optimum point with respect to fuel consumption and exhaust after-treatment for reducing particles and NO<sub>x</sub>, it seems probable that lower emissions and less fuel consumption can be attained.

The refurbishing of EURO 1 (EURO 2) into EURO 3 (EURO 4) engine will be tested by van der Luyt during the first three months of 2003. For March 2003, a test by TNO, Delft (NL) is foreseen in order to decide whether this method achieves the legal emission levels.

**PM NO<sub>x</sub> trade off**

Norm	Year	CO	HC	NO <sub>x</sub>	PM
■ ECE R49	1982	14.00	3.50	18.00	
■ EURO 1	1992	4.90	1.10	9.00	0.40
■ EURO 2	1996	4.00	1.10	7.00	0.15
■ EURO 3	2001	2.50	0.70	5.00	0.10
■ EURO 4	2005	1.50	0.46	3.50	0.02



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# Emission Control by the Preparation of Green Accounts

Vognmand Johnny Amtoft

VOGNMAND JOHNNY AMTOFT

DK

The road haulage company Johnny Amtoft employs a staff of 7 – all drivers. The company transports goods with 7 road trains that range in size from 38 to 48 tons. Johnny Amtoft transports food, industrial goods, box springs, and mattresses. They deliver goods throughout the EU and prefer to deliver to Sweden, Germany, and France. In 2000, the company's vehicles travelled circa 1 million km.

In 1999, Johnny Amtoft published their first green account (environmental report). The preparation of green accounts is done on a voluntary basis.

The company is actively involved in protecting the environment. For this reason, the company utilizes raw materials and energy as efficiently as possible. In accordance with their environmental policy, Johnny Amtoft tries to protect the environment by:

- Optimising the choice of routes and the use of vehicles.
- Using biodegradable cleansing agents.
- Using washing facilities that clean and reuse water.
- Offering fuel-efficient driving courses to the drivers.
- Complying with the most current EURO standards.

Preparing green accounts enables the road haulage company Johnny Amtoft to improve transparency in terms of resource consumption and the environmental impact resulting from their operation. Green accounts contribute to efficient management and help make employees more aware of the goal of sustainable development.



- In order to fulfil the legal requirements, green accounts have to consist of 3 parts:
1. General information about the company and a description of important resources and environmental aspects.
  2. A statement from the management concerning the environment, declaration of possible deviations from earlier accounts, staff participation during the preparation, and possible involvement of environmental working conditions.
  3. A quantitative account presenting the environmental performances (with regard to the resources and the environment) of the company.

The green accounts of Johnny Amtoft were prepared by the management. The initial step was to choose and prioritise the environmental aspects that should be included in the report. Other employees produced the quantitative account of the resources and environmental aspects of the company.

Johnny Amtoft has always recorded the company's



Input-output statement – Vognmand Johnny Amtoft trucks			
The basis year for indexing is 1999 = 100			
	Quantity 2000	Quantity per km	Index 2000
Energy consumption			
Electricity (kWh)	8'127	-	103
Heating (litre of fuel)	3'066	-	95
Water (m³)	120	-	98
Raw material consumption			
Diesel oil (litre)	326'918	3'082	99
Lubricants (litre)	-	-	-
Emissions into the air			
CO <sub>2</sub> – goods transport (g)	865'024'868	858.48	99
CO <sub>2</sub> – others (g)	13'862'562	-	98
SO <sub>2</sub> – goods transport (g)	27'461	0.03	25
SO <sub>2</sub> – others (g)	15'700	-	100
NO <sub>x</sub> – goods transport (g)	9'143'574	37'081	100
NO <sub>x</sub> – others (g)	18'522	-	101

The environmental index for diesel consumption of goods transport is calculated as diesel consumption per km driven. Similarly, the environmental index for emissions of goods transport is calculated as emissions per km driven. The remaining environmental indices are calculated on the basis of absolute amounts.

consumption of diesel oil, water, heating, electricity, and tires – important fields of action for the company. Subsequently, the emission data stated by International Transport Denmark (ITD), a national transport association, made it possible to convert these numbers into relevant





environmental data (for example: the emission of CO<sub>2</sub>, NO<sub>x</sub>, CO, HC, particles and SO<sub>2</sub> from engines and CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub> from electricity and power works).

A green account will be prepared annually. It is not yet known if green accounts contribute to efficient management and reduction in the impact on the environment. This will be determined by future green accounts. A green account was prepared for 1999 and for 2000 (see previous table "Input-Output Statement").



The preparation of the first green account of the company took circa 16 hours. The most time-consuming task was the documentation. The subsequent green account was less time-consuming because the company knew the procedure.



#### BENEFITS FOR THE ENVIRONMENT

If the 1999 green account is compared with the 2000 green account on the basis of absolute amounts (see figure "Input-Output Statement"), then a reduction in the consumption of certain resources can be determined. At the same time, the use of other resources increased. The improvements were not as great as expected. This may be explained by the fact that the drivers of the company already drive safely and use fuel efficiently.

Increased consumption does not necessarily indicate that the company was not able to carry out efficient control. It could be a consequence of, for example, several transport tasks, longer routes, and colder winters.

For a better interpretation of the resource consumption and the environmental impact derived from the green accounts, the company developed some trade-specific key figures. For these key figures, resource consumption and emissions connected with goods transport performances are related to a given unit;



in this case, the number of kilometres driven per year.

On the basis of the calculated environmental indices, it was determined that the consumption of diesel oil was reduced by 1% from 1999 to 2000.

Emissions of HC, CO and particles remained unchanged, while the emission of SO<sub>2</sub> was reduced by 75%. A striking reduction in the emission of SO<sub>2</sub> resulted from the usage of low-sulphur diesel (50 ppm) in 2000.

Johnny Amtoft is convinced that more and more transport buyers will demand documentation of the suppliers' environmental performance. In the future, green accounts will be compared with the financial statements of the company – but only for internal use.

For the present, the main purpose for preparing green accounts has been fulfilled and, as a result, new objectives and guidelines have been set.



#### BENEFITS FOR THE COMPANY

For the present, Johnny Amtoft is the only transport company in Denmark that publishes a green account. Among other things, this has attracted the attention of the press. As well, the account was used in accounting courses for road transport companies.

The company clearly demonstrates that they can meet the challenge of integrating sustainable development into their daily operations.

The company achieved an image gain among those customers, who take environmental issues into account when choosing an appropriate transport company.

Green Accounts enable customers and other interested parties to estimate the company's environmental achievements.



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