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Neste Oil Quarterly Magazine | 01.2007

A better ride

Fuels of the new generation.

NESTE OIL

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01.2007

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DIESEL FUEL IS GETTING GREENER.

Renewable raw materials will be used to produce even better diesel fuel in the future, using advanced new technology.

DIESEL VEHICLE DRIVERS deserve to be taxed less, believes **Pekka Tuovinen**, Neste Oil's Vice President, HSE.

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REFINE IS **NESTE OIL'S** QUARTERLY MAGAZINE FOR INVESTORS, CUSTOMERS AND OTHER STAKEHOLDERS. PUBLISHED IN FINNISH AND ENGLISH.

Helping the world with (bio)diesel

MORE DIESEL CARS came on to the roads than gasoline-powered equivalents in Western Europe for the first time ever last year – in line with a trend towards diesel that has been growing for some time.

DIESEL ENGINES have always had a reputation for durability, but they've also been criticized in the past for their poor acceleration and pollution, with good reason. Today's diesel engines, though, are highly efficient, and offer low mileage figures and tailpipe emissions, as well as great torque and driveability. Everyone can appreciate their good mileage performance, especially given the rise in fuel prices that we've seen over the last couple of years. Improvements in engine technology and diesel fuel properties have both contributed to lower tailpipe emissions.

REDUCING OUR DEPENDENCE on oil is something that interests more and more of us in the industrial world and elsewhere. People are becoming concerned about how the ownership of reserves are being concentrated in an increasingly smaller number of hands, while longer term the general concern is about how long oil will last. The need to mitigate climate change is also becoming an increasingly important issue. Switching from fossil fuels to fuels based on renewable resource is a very effective way of helping here.

TAILPIPE EMISSIONS are one of the factors contributing to global warming, and diesel vehicles are the fastest way of reducing the latter. Moving to renewables-based diesel will only further help.

Neste Oil will start up two new diesel lines at its Porvoo refinery in 2007. Line 4 will produce a million tons of sulfur-free diesel fuel a year from heavy fuel oil, which has become a low-value problem product for many refiners as demand for it has declined. A little later, we will start up our first NExBTL Renewable Diesel plant. Based on our own proprietary technology, the plant will use vegetable oil and animal fat as feedstock to produce a very advanced fuel – and one that numerous tests by independent researchers and engine manufacturers have shown can beat the best conventional diesel fuel hands down. NExBTL Renewable Diesel will be the first true quality biodiesel anywhere. Dieselization clearly means cleaner traffic – a perfect fit to Neste Oil's strategy. That is why we at Neste Oil have been investing in diesel production.

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Jokke Kämäräinen of Rukapalvelu believes that people's biggest adventure comes when they push themselves that bit further.

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DIESEL'S now SULFUR-FREE

1 WHAT'S THE RIGHT FUEL FOR THE TIME OF YEAR?

Sulfur-free diesel fuel is designed for vehicles fitted with oxidation catalytic converters and particulate filters. Emission limits recently approved by the EU will make particulate filters a must in diesel vehicles as of 2009.

"It's also been proposed that particulate filters should be made compulsory for older vehicles as well, but that's difficult from a technical point of view. Filters often have to be carefully tailored to an engine," explains Development Manager **Seppo Mikkonen**.

Neste Oil's sulfur-free summer diesel grades (DIR-0/10 and DIR-5/15) and winter grades (DIR-15/25 and DIR-29/34) are available at service stations and unmanned outlets at the appropriate time of year. Arctic grade DIR-40/44 is only needed when the temperature really plummets, and is normally only on sale in Lapland.

2 HOW ABOUT EMISSION LEVELS?

Sulfur-free fuel offers clear advantages for distribution trucks and buses in urban areas. Sulfur-free diesel has less odor impact, both as a fuel and in the form of tailpipe emissions than conventional diesel. It also has less of an impact on health, as emissions contain less polyaromatic hydrocarbons (PAH). This lower level of environmental impact affects all vehicles, both old and new.

3 LET'S TALK PRICES

Producing higher-quality fuels always costs more. To ensure that the upward pressure on prices at the pump does not impact drivers, lower-emission diesel fuel is taxed at a lower rate in a number of countries, such as Finland, Sweden, Denmark, Britain, and Germany.

Legislation introduced in Finland in 2004 requires that sulfur-free diesel fuel can contain sulfur a maximum of 0.001% by weight. Sulfur-free content reduces the tax levied on diesel by €0.0265/l compared to standard diesel. Neste Oil now produces solely sulfur-free diesel fuel; its NExBTL Renewable Diesel is also sulfur-free.

OXIDATION CATALYTIC CONVERTER

Uses rare metals such as platinum and palladium as catalysts for oxidizing traces of exhaust emissions. A unit can cut CO and HC emissions by up to 90%.

PARTICULATE FILTER

Particulate matter collected is burned at between 400 °C and 500 °C when a vehicle is in motion or stationary.

CLOUD POINT

The temperature at which the paraffin-chain hydrocarbons in a petroleum product begin to crystallize as it cools. These paraffins redissolve when the temperature of the product climbs above the cloud point. Too high a cloud point limits the usability of a fuel at low temperatures, as paraffin crystals can block fuel filters.

CETANE NUMBER

A number used to measure the ignition quality of a diesel fuel. When fuel is injected into the combustion chamber, it ignites after a brief delay under the influence of the high pressure and temperature present. If a fuel has a high cetane number, the delay is short and combustion efficient. In the case of fuels with a low cetane number, a fuel ignites after a longer interval, giving higher levels of tailpipe emissions, noise, and engine knock. The cetane number of diesel fuels is generally 51–55, while that of gasoline and alcohols is lower, at 0–20.

COLD FILTER PLUGGING POINT **(CFPP)**

The lowest operating temperature of a fuel in a well-constructed, properly maintained vehicle, based on empirically collected standardized data. CFPP can range from a few degrees below a fuel's cloud point to over 15 °C below.

TEXT JARI KOHONEN | **PHOTOS** KARI HAUTALA AND CITROËN

DIESEL VEHICLES ARE COMING!

The European Union has announced that it wants to target average CO_2 emissions for new cars of a maximum of 120 g/km by 2012 at the latest. This will require gasoline-powered cars to achieve mileage figures of 5 l/100 kilometers, and diesel cars 4.5 l/100 kilometers. Many new diesel cars are already approaching this type of performance, and smaller engines have already achieved it.

"Automotive manufacturers have the potential to achieve these targets, but the problem lies with consumers' expectations. That's why it's important that we should shift from taxing the purchase price of vehicles to taxing their use," says **Pentti Rantala**, the Managing Director of the Finnish Central Organisation for Motor Trade and Repairs.

The high average age of the vehicles on the road in Finland is a problem in reducing traffic fuel consumption and emission levels, as is the relatively low proportion of diesel cars. The only other country in Europe where vehicles are more than 10 years-old on average is Norway.

Diesel cars are most popular in Europe in Belgium, where they account for 72.6% of all cars, followed by France (69.1%), and Austria (64.7%). Europe reached an average figure of 50% in 2006, when sales of new diesel car reached a record 20.3% in Finland.

Olli Lindroos, of the Finnish Vehicle Administration (AKE), does not believe that the extra annual license fee levied on diesel cars is the real issue. "The annual license fee, fuel costs, insurance premiums, service costs, tires, and purchase price of larger cars are all higher than those of smaller vehicles, but people are still buying increasing numbers of larger cars. The environmental impact of cars simply does not seem to be important when people buy a car."

See: www.nesteoil.fi → media → publications → Refine Online

The 1.6-liter diesel engine of the Citroën Xsara Picasso recently won the car the 2007 Ecocar of the Year award. First announced in 2000, the Xsara Picasso had the lowest consumption of any car in the test group. Consumption accounts for 50% of the points in the award, as it affects both the environment and drivers' wallets. Other criteria include tailpipe emissions, performance, noise, interior design, and safety features.

CHOOSE THE RIGHT DIESEL FUEL

Fuels should be selected according to ambient temperature conditions. All the fuels listed contain less than 0.001% sulfur by weight.

	SUMMER GRADE (1.5.–31.8.)	SUMMER GRADE (1.9.–30.4.)	WINTER GRADE	WINTER GRADE	ACTIC GRADE
Diesel fuels	DIR-0/10	DIR-5/15	DIR-15/25	DIR-29/34	DIR-40/44
Cloud point = lowest reliable storage temperature	0	–5	–15	–29	–40
CFPP = indicative figure for the lowest temperature at which a vehicle will run if its fuel has been stored appropriately	–10	–15	–25	–34	–44
Cetane number	≥ 51	≥ 51	≥ 51	≥ 51	≥ 51

Better quality

TEXT OLLI MANNINEN | **PHOTOS** TOMMI TUOMI AND NESTE OIL | **ILLUSTRATION** JUSSI

A new plant producing high-quality renewable diesel is due to start up at Neste Oil's Porvoo refinery this summer – and will be the first facility of its type anywhere.

Premium quality, performance matching or exceeding automotive manufacturers' expectations, low tailpipe emissions, excellent combustion, and good performance even in the cold, are what NExBTL Renewable Diesel is all about," according to Vice President, Product Development Ari Juva.

Neste Oil's Next Generation Biomass To Liquid Renewable Diesel is produced by hydrogenating fatty acids from vegetable oil and animal fat into paraffin-chain hydrocarbons.

By starting commercial production of the new product, Neste Oil will become a major European biofuel producer on a market that saw some six million tons of biodiesel produced in 2006, mainly in Germany, Italy, and France.

Production elsewhere in Europe is based on older esterification technology, typically using oilseed rape, however.

BIODIESEL!
A series of articles on the birth of a new fuel.
Part 1:
Production technology

See the Web edition:
www.nesteoil.com → media → publications → Refine Online

KORHONEN

"The quality of RME- or rape methyl ester-based biodiesel is not all that great, and this was one of the reasons why we decided to develop a more advanced technology," says Juva.

Compared to NExBTL, RME combusts less completely, is more unreliable in terms of storage, and does not perform well at low temperatures.

"RME's production costs have also risen, with the sharp rise in the world price of oilseed rape in recent years."

A STRONGER PRODUCTION BASE IN EUROPE. A wide range of cheaper feedstocks can be used in producing NExBTL Renewable Diesel in contrast. The resulting product is very consistent and has attracted a lot of international attention.

Work has already started on a second, similar-sized plant alongside the first NExBTL plant at Porvoo, and this is expected to be completed at the end of 2008. Talks are also under way on plants elsewhere with a number of potential partners.

The demand for biodiesel in Europe is growing rapidly. Current EU environmental targets are aimed at ensuring that biofuels will account for 5.75% of traffic fuels by 2010, 10% by 2020, and 25% by 2030.

"Achieving the target set for 2020 will require over 30 million tons of biofuel production annually. That's seven to eight times our total diesel output at Porvoo," says Juva.

In addition to environmental considerations, the EU also wants to cut the Community's reliance on crude oil and reduce the pressure on crude prices. Biodiesel will not solve traffic fuel problems at the drop of a hat, however. Diesel vehicles are becoming increasingly popular in the Nordic region, and will need to become even more widely used. Over half of new registrations in Central Europe are already accounted for by diesel vehicles. Tax incentives will have an important part to play in reinforcing this development. |

THE **BIODIESEL** STORY

NESTE OIL first began developing its own biodiesel technology at the beginning of the 1990s when it became clear that esterification-based techniques were incapable of producing product of sufficient quality. Initially, the focus was on seeing whether tall oil would make a good feedstock. Although tall oil eventually proved too expensive, work on it generated some useful know-how.

Neste Oil's current President & CEO **Risto Rinne** launched a wide-ranging biodiesel assessment at the beginning of 2002, led by a team headed by **Jyrki Ignatius**. The aim was to see how the challenges linked to the EU's renewable fuels goals could best be met.

"We went through the various biofuel production processes and technologies that had been developed around the world, looking at their strengths and weaknesses," remembers Ignatius.

"It soon became clear that the quality of the fuel needed to be improved if it was to have long-term commercial potential. We wanted to bring an oil refining perspective to the equation and develop a quality product suitable for a wide range of conditions and one that would fit in with our clean fuels strategy."

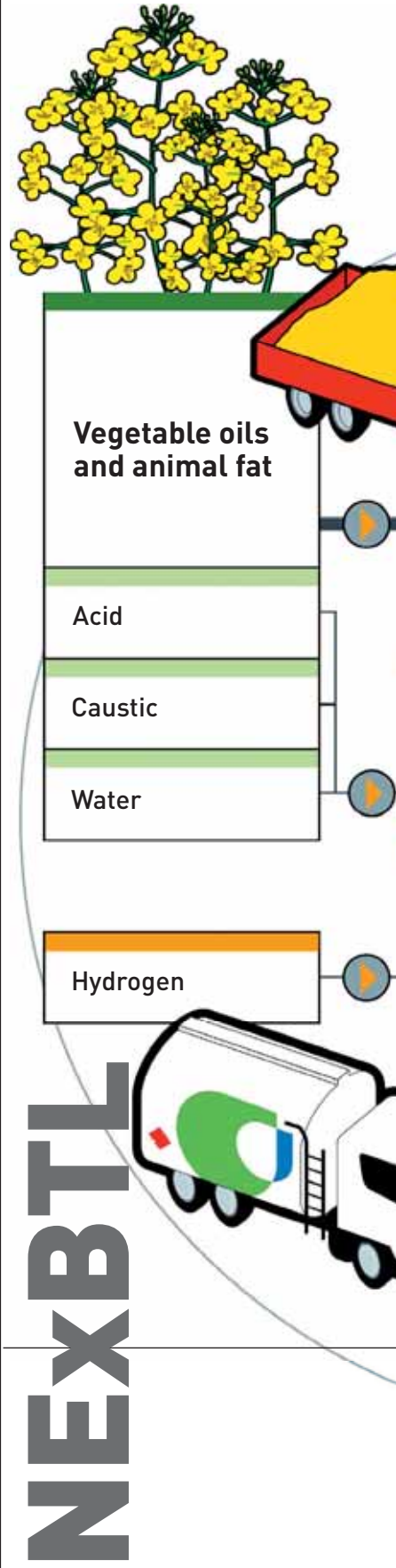

JYRKI IGNATIUS

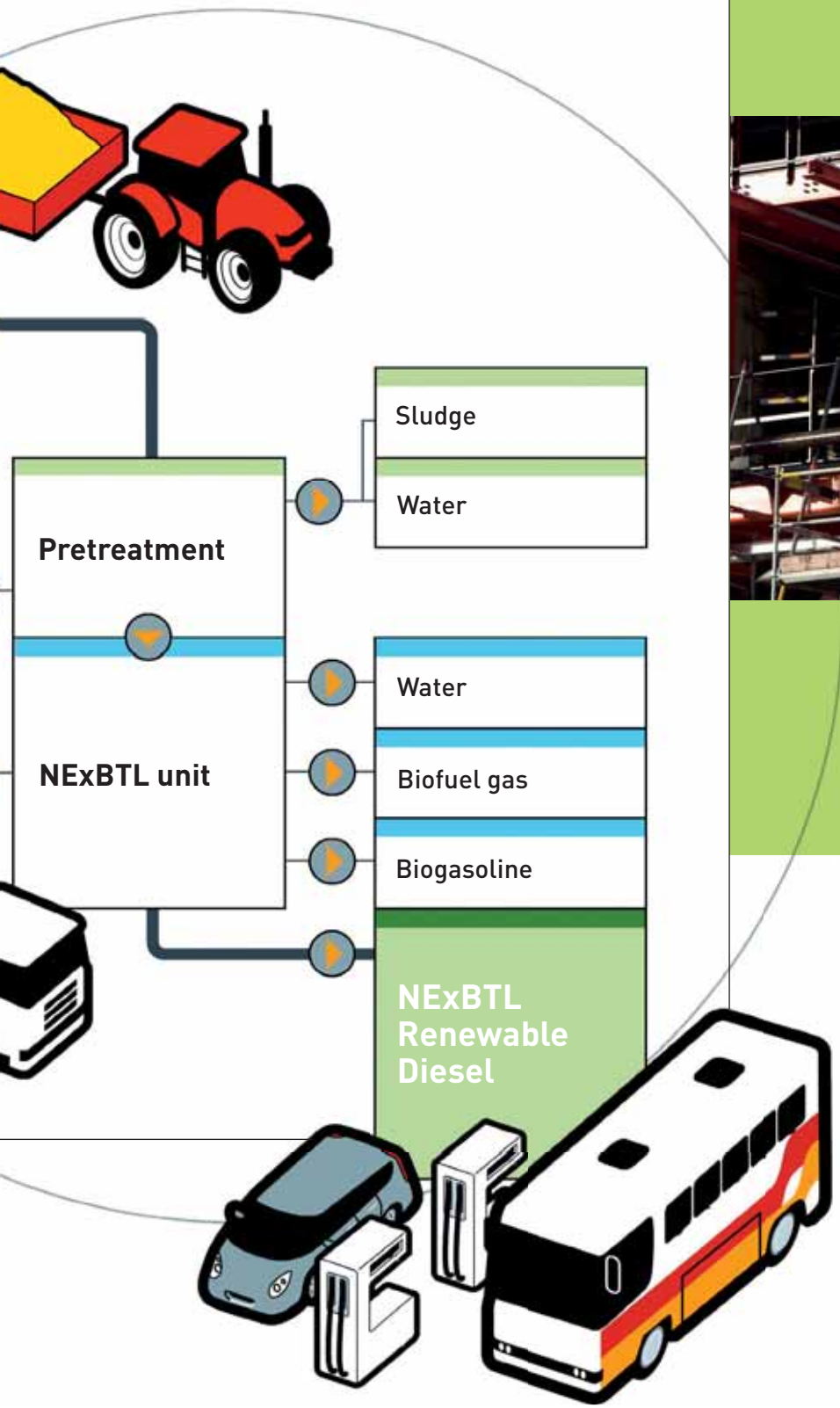
Working together with R&D and Neste Jacobs, the Biofuels Unit led by Ignatius began looking for a solution to the quality challenge and a component suitable for a competitive new biodiesel.

The solution the group hit upon was an isoparaffin hydrocarbon. Tests quickly showed that this approach resulted a better product than the esterification process used in first-generation biodiesel.

"Our large-scale production approach differs from the esterification-based, essentially small-scale approach currently used in Europe. In addition to a unique new technology, we also developed a unique business concept around it as well."

The innovation was patented as NExBTL technology, and forms the basis for Neste Oil's biodiesel strategy. As part of the latter, Neste Oil has formed a new Biodiesel division and announced its intention of becoming one of the world's leading players in the field.





Although the core technology now exists, development work has not stopped.

"Production will start this summer, but we're already working on ways of extending the feedstock base and our technology," explains Ignatius.

A number of large oil companies have also announced their intention of investing in biodiesel development.

"This type of work takes time, though, and we believe that we have at least a three-year lead on our competitors at the moment."

Neste Oil's Biodiesel division is already looking 10 and 20 years into the future and at what types of renewable feedstocks could be used further down the road alongside today's vegetable oil and animal fat.

"There's increasingly strong demand for biodiesel, as both the oil and the automotive industry are becoming increasingly interested in biofuels. We're in a very strong position though, as we've already solved the quality-related problems associated with first-generation biodiesel," says Ignatius.

3 GENERATIONS OF BIODIESEL

PRODUCTION OF BIODIESEL from natural oils began in the 1990s. First-generation biodiesel is based on the esterification of mainly oilseed rape; while ethanol is produced from cereals.

Neste Oil's NExBTL Renewable Diesel is a second-generation product based on hydrogenating vegetable oil and animal fat from a variety of sources. Production will begin at the Porvoo refinery in summer 2007.

Third-generation biodiesel will be based on syngas produced by gasifying biomass and converting it into fuel using Fischer-Tropsch synthesis.

THE FIRST GENERATION. Mainly based on oilseed rape. As vegetable oil is unsuitable as a fuel as such, it is esterified with alcohol to produce enhanced viscosity and low-temperature properties.

The process typically uses methanol, with which the fatty acids in the vegetable oil react to form fatty acid methyl ester or FAME, resulting in biodiesel and glycerin.

A maximum of 5% biodiesel produced from rape methyl ester (RME) can be blended with conventional diesel fuel at the moment.

DEVELOPMENT OF BIODIESEL

	I generation 2000	II generation 2007	III generation 2015
Raw material	Vegetable oil (oilseed rape etc.)	Vegetable oil and animal fat	Biomass feedstock base (incl. canary grass, wood chips)
Process	Esterification	Hydrotreating	Gasification and Fischer-Thopsch synthesis
End-product	RME biodiesel	Biohydrocarbon NExBTL Renewable Diesel	Biohydrocarbon BTL biodiesel

RME-based biodiesel does not match fossil fuel-based diesel in terms of quality, however. Oxygen created during the esterification process, for example, can cause corrosion. The combustion properties of first-generation biodiesel are also far from ideal, and it is a poor performer at low temperatures, and does not store very well either.

THE SECOND GENERATION. Neste Oil has developed a renewable diesel production technology that can use vegetable oil and animal fat to produce a hydrocarbon-based diesel fuel.

Fatty acids derived from the feedstock are converted chemically into an isoparaffin hydrocarbon. Water is first used to remove impurities, and then the fatty acids are converted into isoparaffin with the help of hydrogenation and oxygen content eliminated using water extraction.

The resulting component can be blended directly with conventional diesel fuel or sold as such.

The hydrocarbon resulting from the hydrogenation process is essentially a synthetic diesel fuel.

NExBTL Renewable Diesel is significantly better in terms of quality than first-generation biodiesel. It combusts well, has a lower boiling range than normal diesel, its cold performance properties can be regulated, and it does not contain aromatics or oxygen.

The range of feedstocks that can be used to produce NExBTL Renewable Diesel is also much wider than that suitable for producing first-generation fuel.

THE THIRD GENERATION. Work is now under way on gasifying biomass to process a third-generation biodiesel. This process is based on first gasifying biomass to produce syngas that can then be subjected to Fischer-Tropsch synthesis to produce biodiesel, methanol, or dimethyl ester. Suitable syngas can also be produced from natural gas and coal, as well as biomass.

Potential raw materials in Finland for this process could include forest harvesting waste, bark, canary grass, and waste-based materials. **I**

BIODIESEL PRODUCTION CAPACITY IN THE EU, thousands of tons		
	2006	2005
Germany	2681	1669
Italy	857	396
France	775	492
Great Britain	445	51
Spain	224	73
Czech Republic	203	133
Poland	150	100
Portugal	146	1
Austria	134	85
Slovakia	89	78
Belgiun	85	0
Denmark	81	71
Greece	75	3
Sweden	52	1
Estonia	20	7
Slovenia	17	8
Hungary	12	0
Lithuania	10	7
Latvia	8	5
Malta	3	2
Cyprus	2	1
Finland	0	0
Ireland	0	0
Luxemburg	0	0
Holland	0	0
TOTAL	6069	3184

- **Biodiesel production** increased by 65% in 2005 compared to 2004, when production took place in only 11 countries in Europe. Source: European Biodiesel Board
- **Biodiesel** accounted for 85% of European biofuel production in 2004, according to AMFI (Advanced Motor Fuels) statistics.
- **Biodiesel** is mainly produced in Europe, while ethanol is the fastest-growing alternative fuel in the US and Brazil.

GASIFYING OUR WAY FORWARD

SYNGAS TECHNOLOGY can be used to produce new alternatives for biofuels. These will be essential, as the current amount of arable land in Europe is simply insufficient to produce enough raw materials for future needs.

"The technology we're developing can use a variety of wood-based biomass, straw, or canary grass, which makes it more versatile in terms of feedstocks than Neste Oil's NExBTL process," says Project Manager **Esa Kurkela** of VTT Technical Research Centre of Finland.

"While the end-product of both processes is the same, I don't see them as competitors, more as complimentary to each other."

Raw material fed into the VTT process is initially gasified to produce a syngas containing hydrogen and carbon monoxide. This syngas is then processed into diesel fuel with the help of Fischer-Tropsch synthesis, a process that was used to produce liquid fuel in Germany in the 1930s, and more recently in South Africa.

"Purifying syngas is critical to a quality diesel fuel. Syngas technology opens up new opportunities for the forest products industry, in particular, as pulp and paper mills could use the steam produced as a byproduct of gasification as an energy source."

A pulp or paper mill would make a natural partner for VTT's technology concept, as this type of integration would also offer logistics benefits in terms of raw materials.

Neste Oil has been involved from the start in the three and half-year project on syngas and ultraclean fuel gas funded by Tekes, the Finnish Funding Agency for Technology and Innovation, and coordinated by VTT. The first demonstration plant is due to be completed in 2009.

NExBTL PLANT PROGRESSING WELL

PRODUCTION is beginning to ramp up at the new plant being built to produce NExBTL Renewable Diesel at the Porvoo refinery. The first deliveries of vegetable oil and industrial-grade animal fat arrived at the refinery in February. Test runs of the new pre-treatment unit have been completed, and operations will start at the unit in March.

Pipework installation at the facility and tank farm is continuing. All unit training has now been completed, and construction and installation work has been accident-free.

"WE NEED A STRATEGY FOR BIOMASS USE"

BIOFUELS HAVE A LOT OF ECONOMIC POTENTIAL, according to **Jouni Tolonen**, an energy and climate change expert with the Confederation of Finnish Industries EK, and he argues that Finland needs a national strategy on how best to use biomass in the future.

"Biofuels clearly have a lot of potential, as demand for them is growing all the time, and the EU wants biofuels to account for 10% of traffic fuel usage by 2020."

What is important now, according to Tolonen, is to push ahead with new-generation fuels that offer lower production costs and a better energy and greenhouse gas balance.

"The broader the feedstock base, the better too, as there's only a limited amount of biomass available for producing traffic fuels. We need a clear national strategy on biomass usage, as the same raw material is also used by the forest products industry and in generating energy."

He supports the idea of tax incentives to encourage the use of biofuels on the road.

"Higher costs are a particular problem for freight in terms of competitiveness. If road users are simply required to use biofuels, without any consideration given to the costs involved, these additional costs will become a burden for road users."

Biofuels also offer a useful way of reduced traffic-related emissions.

"Although road traffic does not come under the EU's emission trading scheme, we need to reduce emissions not only through areas covered by emission trading but also elsewhere as well, if we are to meet our climate change obligations."

NESTE SHUSHARY OPENS IN ST. PETERSBURG

A NEW TYPE of 'service plus' distribution outlet was opened in St. Petersburg in December last year. Personnel are available to fill up vehicles if requested, and drivers can buy cigarettes, soft drinks, and other products at the station's checkout.

Drivers can also fill up their screen wash and check their tire pressure at the station.

Located on the main road to Moscow, Neste Shushary has proved popular with drivers and sales have developed positively.

EXPERTS TO MEET IN HELSINKI

ChemBio FINLAND 07

CHEMBIO FINLAND 07 will bring together a cross-section of specialist in the fields of chemistry and biotechnology in Helsinki between March 27 and 29 this year. Neste Oil will have its own stand (6f41).

People intending visiting can check out the program and register at **www.chembiofinland.fi.**

PARTNERING WITH **WWF** TO **PROTECT THE BALTIC**

WWF FINLAND and Neste Oil are to continue working together to protect the Baltic and promote sustainable energy generation in 2007 and 2008. A new partnership agreement was announced recently at an event on NExBTL Renewable Diesel in Helsinki.

The WWF's Operation Mermaid is aimed at improving the protection of the Baltic's most endangered habitats and species, halting the spread of entrophication, and preventing oil spills and the use of hazardous chemicals harmful to the environment. Neste Oil has been an Operation Mermaid partner since it was launched.

"We want to see all Finnish harbors equipped with escort tugs to help prevent oil spills, like those used by Neste Oil with its tankers," says **Timo Tanninen**, the CEO of WWF Finland.

"We also want to ensure that the palm oil used as a feedstock for NExBTL Renewable Diesel is produced in an ecologically, socially, and economically sustainable way," says Neste Oil's Feedstocks Manager **Kaisa Hietala**.

AVIATION OPERATIONS IN LATVIA SOLD TO **STATOIL**

SIA LATVIJA STATOIL has acquired Neste Oil's aviation fuel business based at Riga International Airport from SIA Neste Latvija, subject to the approval of the Latvian authorities. The divestment forms part of Neste Oil's strategy of focusing on its core businesses.

Sales of petroleum products in Latvia will continue unaffected. Neste Oil currently has 38 Neste A24 unmanned outlets in the country, and is Latvia's second-largest fuel distributor.

CRUDE PRICES PEAKED **IN THE SUMMER**

CRUDE PRICES in 2006 peaked during the summer, at over USD 78/bbl, as a result of the crisis in Lebanon and a shutdown in production in Alaska. Political tension in Nigeria, Iranian moves to enrich uranium, and terrorist strikes against targets in northern Iraq also contributed to higher prices.

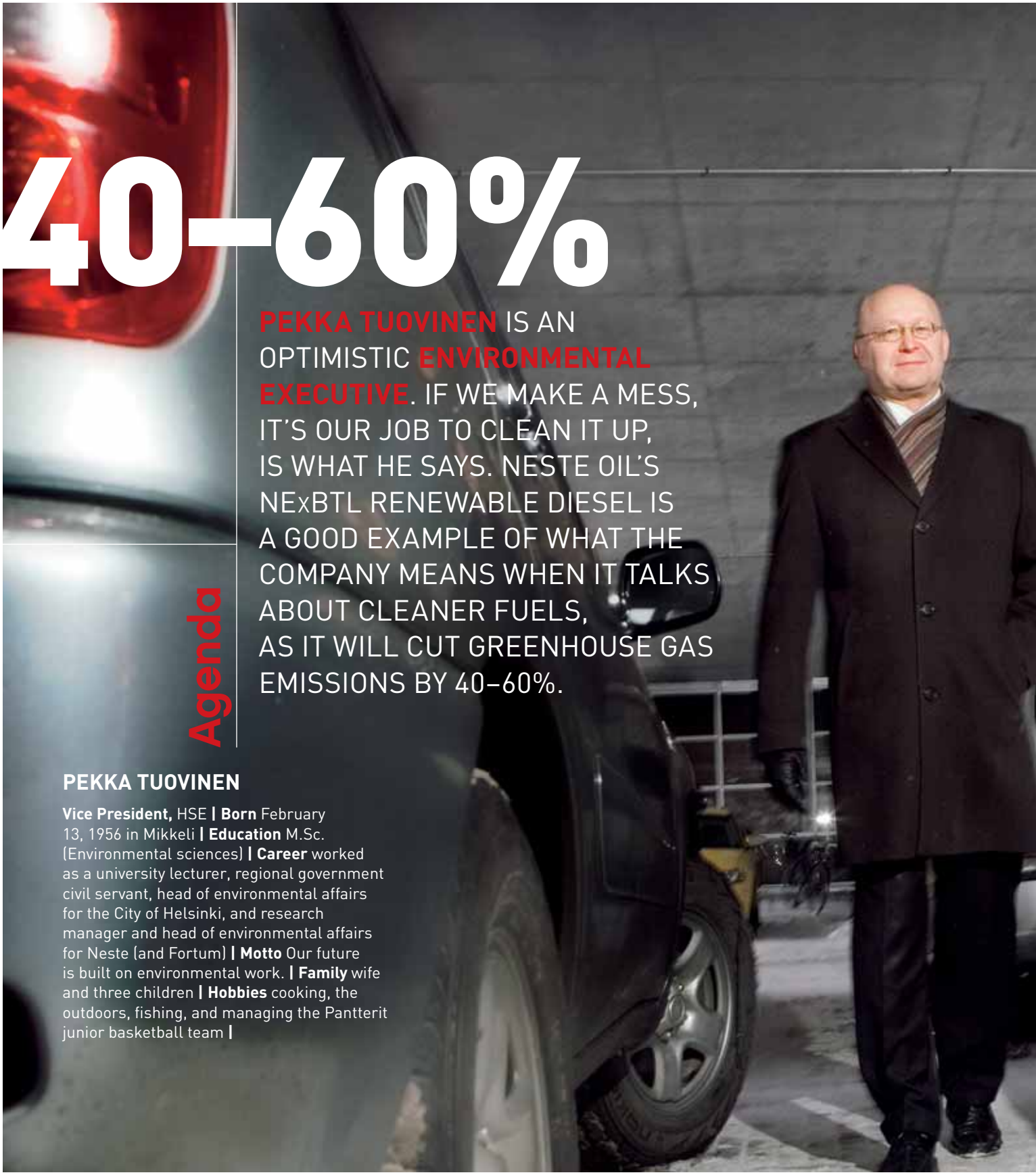
Overall world oil demand in 2006 reached 84.4 million bbl/d, up 0.9 million bbl/d on 2005. Demand in China rose by nearly 8%. Production in non-OPEC countries grew very little, while OPEC production remained at close to 30 million bbl/d until production cuts were imposed at the end of the year. Although the growth in Russian output slowed, Russian production still reached a new record of 9.65 million bbl/d.

Crude prices dropped significantly in the fall, as a result of high inventories, unseasonably warm weather, and a calmer international situation; and crude closed the year at around USD 60/bbl. High crude price have gradually begun to reduce consumption, although economic growth continues to keep demand strong.

PRODUCTION TO BEGIN SOON

COMMISSIONING WORK on the new diesel line at the Porvoo refinery is well under way, and the line is expected to start up in April. Mechanical completion was achieved in December 2006.

The project has cost over €700 million and will increase Neste Oil's sulfur-free diesel fuel capacity by over a million tons a year and cut the refinery's output of heavy fuel oil. Thanks to the new facility, the refinery will have the capability to switch over completely to heavier, sourer crude input.



40–60%

PEKKA TUOVINEN IS AN OPTIMISTIC **ENVIRONMENTAL EXECUTIVE**. IF WE MAKE A MESS, IT'S OUR JOB TO CLEAN IT UP, IS WHAT HE SAYS. NESTE OIL'S NExBTL RENEWABLE DIESEL IS A GOOD EXAMPLE OF WHAT THE COMPANY MEANS WHEN IT TALKS ABOUT CLEANER FUELS, AS IT WILL CUT GREENHOUSE GAS EMISSIONS BY 40–60%.

Agenda

PEKKA TUOVINEN

Vice President, HSE **| Born** February 13, 1956 in Mikkeli **| Education** M.Sc. (Environmental sciences) **| Career** worked as a university lecturer, regional government civil servant, head of environmental affairs for the City of Helsinki, and research manager and head of environmental affairs for Neste (and Fortum) **| Motto** Our future is built on environmental work. **| Family** wife and three children **| Hobbies** cooking, the outdoors, fishing, and managing the Pantterit junior basketball team **|**

TEXT KIRSI RIIPINEN | **PHOTOS** MIRVA KAKKO

The sun has almost a spring feeling about it as it shines through the windows of the office of Neste Oil's Vice President, HSE **Pekka Tuovinen.** It is so bright, in fact, that Tuovinen has to get up and adjust the blinds, which leads the conversation around to the subject that has caused so much debate in Finland this year: the late winter. It was not until late January that the winter arrived in earnest.

If nothing else, this should have convinced even the most skeptical that something really is going on in terms of climate change, says Tuovinen.

"The unseasonably high temperatures we saw in December are completely in line with a steadily worsening greenhouse effect. Climate models point to extreme conditions spreading around the globe."

The use of fossil fuels exploded during industrialization and has grown ever since, not least today as more and more countries industrialize – and this has been identified as a major cause of climate change.

The situation raises a lot of worrying questions: what will happen to the world's agriculture, will we run out of water, will whole areas of the world become uninhabitable?

Although Tuovinen monitors environmental developments as an integral part of his work, you could not call him a pessimist.

"Ever since I studied environmental protection back in the mid-1970s, I've always thought that if man creates problems, it's his job to clean them up."

But do not get him wrong. He does not believe that technology has the answer to all of our problems. What is most important, he says, is the desire to do something about them. If nothing else wakes up decision-makers, money certainly will in the end, he says.

"When we start seeing enough major storms and hurricanes, floods, and dry spells, life will simply start to get a lot harder for many of us – and that's when climate phenomena will take on a tangible price that we can't help but react to."

TOO QUICK OFF THE MARK. Oil refining is a very challenging business from an environmental point of view, according to Pekka Tuovinen.

"You've always got to perform well, and you need to know your stuff and be sensitive to the right issues, especially when talking to stakeholders."

Tuovinen is proud of Neste Oil's record on the environment. We cannot survive without fuels today, and the fuels we use should be as clean and efficient as possible, he says, which is the approach that Neste Oil has followed.

"We've been pioneers here. How many people remember that Neste had an environmental protection unit back at the end of the 1960s?"

In some ways, it is easy for Tuovinen to be satisfied, as cleaner fuels continue to lie at the very heart of Neste Oil's strategy.

"Of course, this type of product development costs money, but we've always been something of an oddball in the industry, as we've never tried to postpone environmental-related investments."

Longer term, there is not much sense in doing so, in any case. Outdated products are not likely to interest anyone, and no one wants to invest in old-technology plants.

Being a pioneer included only ordering tankers with a double hull or a double bottom from the 1970s onwards.

"Many of our customers were against the whole idea, and we had to endure a lot of criticism. But we were 30 years ahead of our time, as double hulls are now becoming a statutory requirement."

EVEN CLEANER FUELS HAVE BEEN CRITICIZED. "Even the European oil refining industry's own HSE organization argued for some time that it didn't make sense to produce sulfur-free fuels, for example. We've always argued that it does, and we've invested in it too."

Highlighting the environmental dimension of its products and technology has been a very deliberate move for Neste Oil from a marketing point of view as well. And it has yielded results.

"We got a big order from Western Europe recently to top up emergency fuel stocks with product with a guaranteed long 'environmental shelf life', and that's just what our sulfur-free diesel fuel offers. If you don't win the choice contracts like this, someone else will come and take them from in front of your nose in any case. You've got to have the courage of your convictions, because then you'll win financially as well."

PEKKA TUOVINEN'S **ADVICE** TO FINLAND'S NEW GOVERNMENT

- → Remember that we have a great engine for positive climate change: the diesel. Let's make it more popular.
- → NExBTL Renewable Diesel reduces greenhouse gas emissions by 40-60% compared to fossil fuel diesel. Let's ensure that there's a market for it in Finland.
- → Let's continue to foster a solid base for technological research and development, as know-how and innovations are critical to success in today's rapidly changing world.

NO SKELETONS ALLOWED. Even Neste Oil, however, has not invented all the technologies and built all the plants it will ever need. And this year will see some major advances in terms of the environment.

Take the new diesel line at Porvoo, for example, which will produce sulfur-free diesel fuel from heavy fuel oil.

"The plant's quite an eye-opener, as a unit like this was considered an impossibility, both technically and financially speaking, as little as 20 years ago. But we've made it happen, and again as one of the first anywhere. The plant is so good that virtually whatever kind of bottom product you feed in at one end, you'll get premium-quality end-product out at the other."

Neste Oil will begin producing renewable diesel at Porvoo this summer; and construction work has started on a second unit, due to be completed at the end of next year.

Neste Oil is beginning to be seen as a true technology pioneer in the industry.

"We've been working on a number of projects with other oil companies in Europe to use our technology on a wider basis, in countries such as Austria. Not very many people 20 years ago would have imagined that a small Nordic company would become so sought after for its industry-leading technology in oil refining."

Neste Oil's expertise is not only in demand in Europe, either.

"We're keen to know the operations and views of the partners we work with. Vegetable oils and surplus fats represent important future raw material inputs for our renewable diesel plants, which is why we joined the Roundtable on Sustainable Palm Oil found by the WWF and other non-governmental organizations to promote sustainable agriculture in this area. We don't want any skeletons in our cupboard."

Tuovinen is convinced that high ethical standards will become increasingly important to consumers in the future.

"A lot of people say they support environmentally friendly products, but when it comes down to it they often select the cheapest instead. I'm sure, though, that over the next 10 years the number of enlightened consumers will be significantly larger than it is today." **I**

TWO NEW **TANKERS**

A NEW 75,000 DWT, 1A ice class product tanker, the M/T Stena Poseidon, joined the Neste Oil fleet in January and its sister vessel, the M/T Palva, in February. The new tankers will handle petroleum product deliveries to North America.

To be manned by Finnish crews of 16, the ships have been built at the Brodosplit shipyard in Split in Croatia and were christened there by Board members Maarit Toivanen-Koivisto (Palva) and Ainomaija Haarla (Stena Poseidon). The ships are owned by a joint venture between Concordia Maritime and Neste Shipping Oy.

GETTING THE **BIOFUEL MESSAGE** ACROSS

THE NOTE TRAINING PROGRAM organized by Finland's Youth Academy will focus on environmental issues and biofuels this fall. Neste Oil and the Academy will cooperate on promoting young people's awareness and understanding of the importance of project skills, accountability, and long-term perspectives at school and in hobbies. Funding will be available through the national Homma scholarship program.

RECOMMENDED LUBRICANTS

A new Web-based service has been opened at www.neste.fi to provide drivers with information on which Neste Oil lubricants and car chemicals are best suited for their cars, vans, trucks, buses, and agricultural machinery. The database includes recommendations for over 200 marques and over 12,500 types of application. The service also provides assistance on vehicle-specific oil change and inspection intervals.

Wilderness ADVENTURE

A snowmobile trip in the wilds around Ruka and Kuusamo is not something that anyone will easily forget.

TEXT SATU OJALA | PHOTOS PAAVO HAMUNEN, ARTO WIIKARI AND LEENA SVANBERG

"The sauna is on fire! Don't bring any guests here. When we've got the fire out, we can see what's salvageable."

Surprises and excitement are a specialty of Rukapalvelu, based at the Ruka ski resort in Kuusamo in northeastern Finland, but they do not normally include sauna fires. A little bit of ingenuity saw the company's team get over the setback, though.

"We found a reserve sauna stove in our stores and set up an army tent to create an improvised sauna. Our guests loved the experience, and everyone was happy," remembers Rukapalvelu's Managing Director, **Ari Ålander**.

The company organizes trips, meals, corporate events, and a full range of leisure services year-round. A range of accommodation can handle up to 150 guests overnight. Guests come from all over Europe, Russia, and Finland.

"The company's grown from a one-man business 20 years ago to one employing 40 people today. Everyone does what they're best at, from whitewater rafting to servicing our snowmobiles. We also work closely with other people in the locality who are experts in everything from training husky teams to herding reindeer," says Ari.

A FRIEND IS NEVER FAR AWAY. "Hi there. Sorry to bother you and all, but we've been skiing for hours and we're about ready for a break, but wouldn't you know it, we're not sure where we are any more! You got any idea?"

The business executives staying at Rukapavelu's forest lodge enjoyed the opportunity of showing off their local knowledge, and the ski party was able to set off again. →

”LOCAL SHAMANS HELP YOU UNDERSTAND WHO YOU ARE, WHERE YOU’VE COME FROM, AND WHERE YOU’RE GOING.”

“The wilderness is all about relaxing and shaking off the stress of everyday life,” says **Jokke Kämäräinen**, the founder of Rukapalvelu. “Enjoying a feeling of adventure is important, and sharing time out informally with partners is an excellent way of doing just that for businessmen, for example.”

Firing up a sauna stove, cooking supper over an open fire, or exchanging snapshots of your kids while resting alongside foaming rapids are an excellent way of getting to know people in a way that is just a bit different from the everyday.

“It’s a rewarding business to be in and provides a good source of employment to people in this part of the world, and helps keep our local communities vibrant. Businesses like ours, local government, and local politicians all need to work together to make it a success.”

INTO THE SMALL HOURS. Jokke Kämäräinen learnt how to keep guests happy from a young age.

“My mother used to put skiers and walkers up, and it was us kids’ job to keep them entertained. We used to take people fishing with us, or berrying, or out milking the animals.”

Rukapalvelu’s first wilderness camps were based on the family’s old farm. Jokke was joined on these by his two brothers, Jorkke and Erkki.

“Today, we’ve got a full range of locations to offer, from a sauna bus to a wilderness spa, wilderness cabins, and a fully equipped underground dugout near the Russian border.”

Guests also have the chance to cross the border into Russia to explore the beautiful remote landscape or listen to a choir of locals singing ancient songs.

Biolubrication is good for nature. “All of our 150 snowmobiles are on the move during our peak season in February and March, and we need to fill up the main fuel tank at our depot once a week to keep up with demand,” says **Eki Karja-lainen,** one of Rukapalvelu’s wilderness guides.

“We supply Rukapalvelu with both fuel and lu-

Neste Oil’s Kaija Lind and Rukapalvelu’s Ari Ålander meet a number of times a year.

JANNE TAPIO IS FINLAND'S snowcross star

Janne Tapio has won Finland's Snowcross national championships two years in a row, in 2004 and 2005.

"A SNOWMOBILE'S ideal for seeing winter landscapes that you can't really see any other way. That's what really makes it so exciting", says Janne Tapio alongside his LYNX R-evo.

Janne has been involved with snowmobiles since the age of six, and competed for 18 years. Today, he's also involved in developing new models for the LYNX plant based at Rovaniemi.

"Durability and reliability are key features users need to be able to expect of a snowmobile, whether it's for a day out or a competition. The routes you find in Finland are often pretty bumpy and that demands a lot of the machines."

A seated position is recommended for extended periods on the level, but standing is better for hills and bumpy terrain. This helps protect drivers' backs from excess impact and gives people greater visibility as well.

"Driving is a very physical activity, and in addition to training, I also run, visit the gym regularly, ski, mountain bike, and swim to keep fit. Good back and stomach muscles are important, even for the occasional driver. And snowcross tracks are good places to hone your driving skills."

THE RIGHT FUEL AND LUBRICANT.

A typical snowcross competition involves around 20 competitors, who leave the start line together and test their skills against each other over a kilometer-long circuit full of tight turns and jumps. The fastest drivers get through 20 laps in about 20 minutes.

The engines and transmissions of competition machines need to be finely tuned to give the performance needed. The best fuels and lubricants are also essential. Competition machines are powered by two-stroke engines that use between 25 and 30 liters of fuel over 100 kilometers.

"I'm a great believer in Neste Futura gasoline and Neste 2-T Super Racing lubricants. I've always found they deliver, however tough the competition. But they can't help if a driver forgets to tighten down the fuel cap or fill up! That's always down to the driver," he laughs.

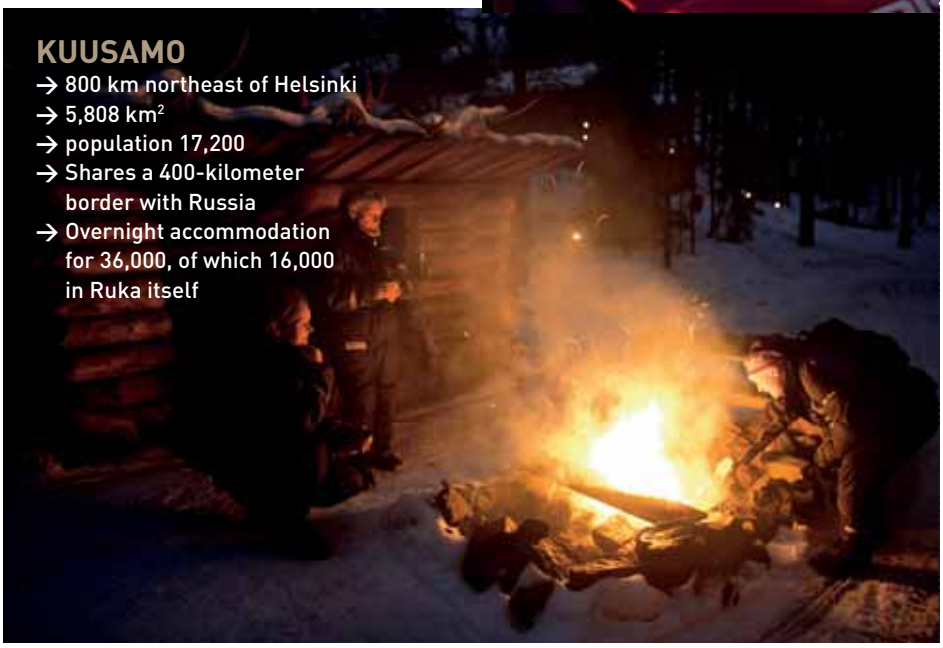
"The best fuels and lubricants are essential."

Guide Eki Karjalainen

bricants, and have worked with them for 11 years now," explains Neste Oil's **Kaija Lind.** "That includes premium-grade gasoline and bio-based lubricants. The Rukapalvelu site also includes a Neste A24 unmanned outlet."

Kaija visits Ruka a couple of times a year to meet both her contacts at Rukapalvelu and others in the area.

"These meetings are important, as the better you know your partners, the smoother things work," says Kaija. |



KUUSAMO

- → 800 km northeast of Helsinki
- → 5,808 km²
- → population 17,200
- → Shares a 400-kilometer border with Russia
- → Overnight accommodation for 36,000, of which 16,000 in Ruka itself

DON'T LET THE THROTTLE **RUN AWAY WITH YOU!**

There are over 18,000 kilometers of designated snowmobile routes and tracks in Finland, and over 115,000 registered snowmobiles.

Around 500 snowmobile accidents a year take place, and 12 people lost their lives last year. The most dangerous spots are thin ice on lakes, and the most serious accidents usually occur when snowmobiles collide or fall through the ice.

"We would probably avoid the majority of these accidents if drivers stayed off the bottle. The same limits cover snowmobile drivers as normal drivers. 50 milligrams per 100 milliters of blood is already too much," says **Reijo Köngäs** of the Rovaniemi Police.

Snowmobiles are restricted to marked routes on Metsähallitus (Forest Commission), public, private, and association land. Diverging from these routes requires the permission of the relevant landowner.

"Drivers should respect nature and other people at all time to maximize safety," says **Erkki Turtinen** of Metsähallitus. "Thanks to product development work, snowmobile emissions are half what they were in the 1990s, and their exhaust sound levels are a lot lower too."

6 TIPS FOR DRIVERS

- → Helmets are compulsory
- → Snowmobiles typically cost between €7,000 and €10,000, and need to be registered and insured. Driving on Metsähallitus land requires a permit.
- → 15-year-olds can drive off-road
- → The speed limit on marked routes is 60 km/h, 80 km/h on ice, and 40 km/h when towed
- → Snowmobile are not allowed on roads, except to cross
- → Don't litter, create unnecessary noise, or hinder other people.

PHOTO KARI HAUTALA **| CAR PHOTO** MARKUS PENTIKÄINEN

The energy of the future

PETER LUND, PROFESSOR,
ADVANCED ENERGY SYSTEMS
HELSINKI UNIVERSITY
OF TECHNOLOGY

Social developments and energy usage have traditionally gone hand in hand, and the world's most successful countries have always been the largest users of energy, virtually without exception. Developing countries use under 10% per capita of the energy used by industrialized countries, and the poorest countries just 1%. The world sourced its energy on a global basis long before the whole concept of globalization was born. Access to abundant energy has always made favorable economic development possible after periods of war. If we tried to be self-sufficient in energy, a country like Finland would be condemned to a basic peasant economy.

Energy has become a valuable, strategic commodity. For many, it is a symbol of strength and power. How long our energy reserves will last has become a standard subject of debate between the great powers of the world and for many countries' national agendas. When following what the media write about energy, you can't avoid concluding that energy is often used to advance some very partisan causes. The energy 'threat' offers a convenient 'enemy'.

The energy economy is faced with a number of mega challenges that need to be resolved sustainably – including reducing our emissions of greenhouse gases, eliminating energy poverty, and cutting our dependence on oil. Fossil fuels have been the world's most important source of energy for over a century, and no major change is likely here. Even if the days of cheap oil are behind us, relatively cost-effective fossil fuels look set to be available for long into the next century.

Politicians get green. Future energy supplies will be dependent on political decisions. Market forces are simply incapable of guiding developments in a more sustainable direction without input from public decision-makers. The latter are critical to creating demand for clean energy, and in helping new technologies such as biofuels and wind power really break into the market in Europe.

It is easy to feel powerless when faced with today's major energy questions, but many of these problems are solvable with the help of new technology.

A global energy revolution would call for wide-ranging international cooperation and financial commitment, such as devoting 1% of national GDP to energy investments. This type of creative initiative would be sufficient to generate new, profitable, clean, and sustainable energy business.

We are at an important crossroads in Finland, as we are rapidly losing our position on the growing global market for clean energy technology. One reason for this is the lack of a strong home market. Solutions based on our own expertise, such as renewable energy sources and efficient energy usage, typically receive little attention in the energy debate. If we were to take full advantage of this type of know-how, we could meet our additional energy needs competitively and cut emissions by nearly a third by 2020. And on top of that, create a viable export industry as well; which only goes to show that we need the courage of our convictions in the energy economy of the future. |

Winter came to the southern coast of Finland with a vengeance not very many weeks ago. On board the Tempera, the sea looks pretty uninviting under a leaden sky. Through the snow squalls, the onlooker can just make out the outline of the tanker, which has come alongside and tied up at Porvoo, helped by a friendly tug.

"It's usually a very smooth operation, not much to see at all," says the Tempera's master, **Lauri Vuorinen**.

This time is no exception. The Tempera's crew makes it all seem so easy.

SAFETY IS OUR WATCHWORD. A sea of pipes and equipment cover the deck of the tanker, which has become an ice rink thanks to the snow, wind, and freezing temperatures. In conditions like these, even the most experienced crew members need to keep their wits about them.

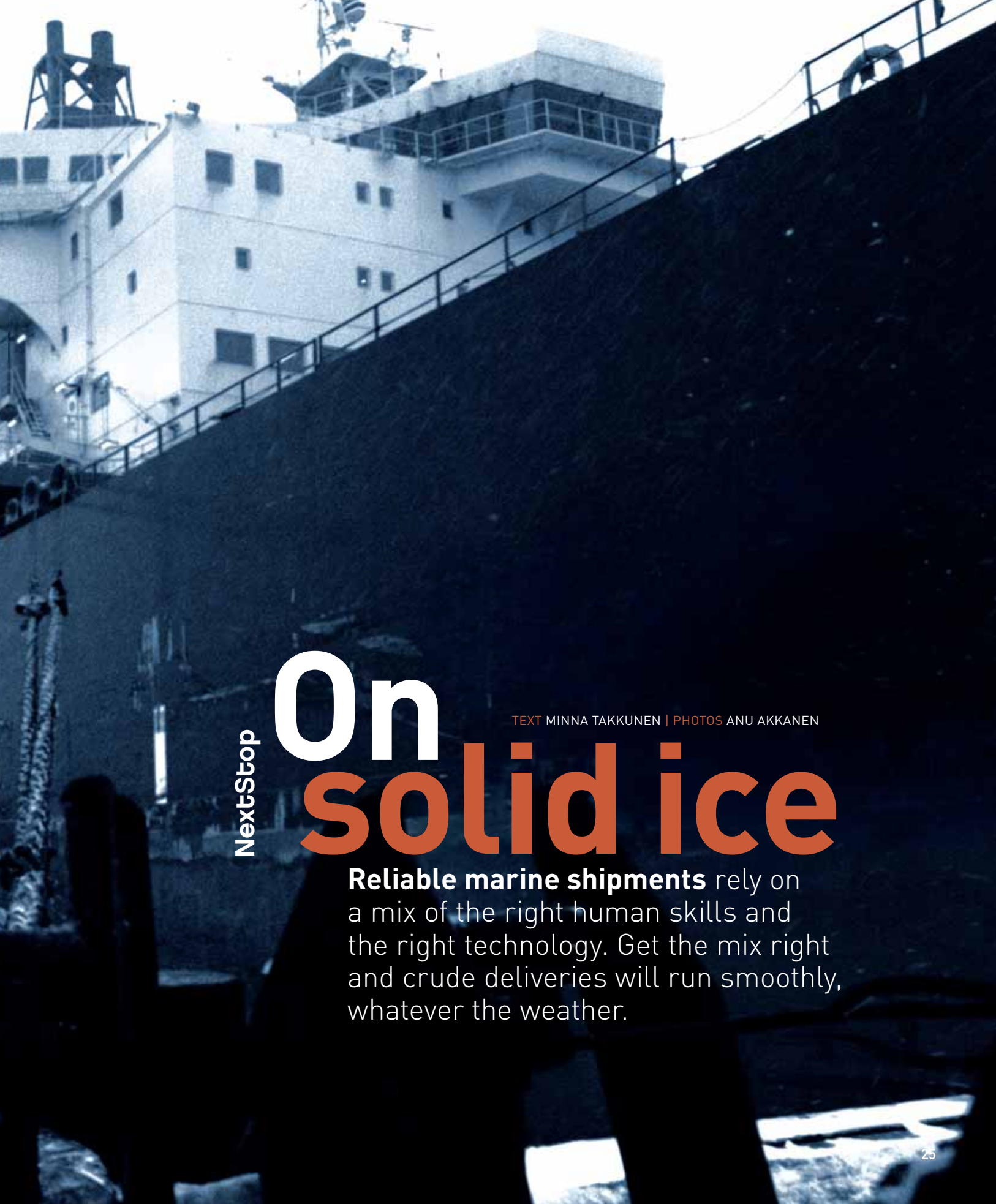
"You can never be too safe," says Vuorinen. "And it's important to set the right example. If I ask the crew to don their hard hats and I don't, I'm not sending the right message at all."

He is echoed by Neste Shipping's Vice President, **Erkki Kotiranta**.

"Safety always needs to be the number-one priority, underpinning everything we do."

Crisis management capabilities are also an important part of everyday operations. These are maintained by regular rescue and oil spill prevention exercises, like the ones which the Tempera has recently gone through, according to **Petra Karjalainen**, who is part of the engine room crew and responsible for maintenance and keeping things shipshape down below. →

M/T TEMPERA **Length** 252 m | **Beam** 44 m | **Height above deck** 22.5 m | **Draught at full load** 15.3 m | **Machinery** 21.7 MW or 29,500 hp | **Displacement** 106,034 dwt | **Hold capacity** 121,158 m^3 | **Ice classification** 1 A Super



NextStop

On solid ice

TEXT MINNA TAKKUNEN | PHOTOS ANU AKKANEN

Reliable marine shipments rely on a mix of the right human skills and the right technology. Get the mix right and crude deliveries will run smoothly, whatever the weather.

STERN FIRST. "The Tempera and her sister ship, the Mastera, are unique," explains Vuorinen.

The ships include a wealth of the latest technology. A sophisticated system monitors the stresses imposed on the ships' extended double hulls, and a large number of on-board functions feature built-in redundancy to guarantee reliability. Advanced navigation systems and electronic charts ensure everybody stays on course. And if the ice gets too thick and threatens to slow things down, the officer on watch just needs to hit the 'handbrake' and turn the ship around to 'engage' the specially designed ice-breaking stern.

The Tempera is mainly employed in the Baltic and the North Sea, but sometimes ranges further afield, most recently to Bilbao in northern Spain at Christmas. The past week proved a pretty busy one as well, as winter storms off the coast of Sweden held up docking and unloading at Gothenburg on Sweden's west coast.

Today, the ship is only carrying 25,000 tons of crude, just enough to cover the bottoms of its tanks, so to speak, as its full load tops out at 100,000 tons.

"The Tempera's a fast ship to take on a cargo, and we can discharge a full load in less than 24 hours," says Vuorinen.

CHECKLISTS HELPS. Keeping an eye on the status of the ship's cargo is the responsibility of Chief Officer **Harri Halmesvirta**. When the Mastera is ready to cast off, it will be the Tempera's turn to discharge.

While the ship is waiting her turn, she replenishes her stores of drinking water, something that has to be done every couple of weeks.

After discharging her cargo, the Tempera will leave for the Primorsk terminal north of St. Petersburg, where she is due to take on 100,000 tons of crude for delivery to Lithuania.

"Everything important is noted down in checklists to ensure that we really do remember them," says Halmesvirta.

BEING A PROFESSIONAL. The size of the Tempera's crew varies between 15 and 20, depending on the time of year and the ship's needs. During the winter, for example, the crew is closer to 20 because of the weather and the ice in the Baltic. It is also often close to that during the summer as well, when maintenance work can be carried out as the ship is under way. This flexibility is a valuable way of guaranteeing safety and keeping the tanker shipshape, says Vuorinen.

"Having the optimum number of crew on board ensures that everybody performs at their best."

The length of crew watches are carefully monitored; the only exceptions are the master and the chief engineer, who are responsible for the ship overall.

"We've got a professional crew aboard the Tempera, and a very low level of turnover, as everyone likes the ship," continues Vuorinen.

Training plays an important part in keeping everybody on their toes.

"Nobody just rolls out of the nearest bar to join the ship when we cast off," he laughs, dismissing people's traditional views of the sailor's life.

PRACTICE MAKES PERFECT. Second Mate **Veli-Matti Rahja** has just rejoined the Tempera after six weeks off, and is being kept busy introducing new crew member, **Tapani Enbuska**, to the ship's routines and checklists. The most important part of Enbuska's induction, according to Rahja, is to ensure that he knows the rescue and firefighting instructions inside out.

An on-board safety meeting is held once a month, at which the crew is always asked for suggestions for improving procedures.

Rahja says he enjoys the life at sea so much now that he cannot think of anything that would get him into an office.

"It's an all or nothing feeling. When we're working, we're working 100%, and when we're at home, we're at home 100%. We've got a great feeling on board, and a crew who really know what they're doing. You need to be tough and able to stick it out too, as you can't just bunk off, like you can on land," he grins.

NO COMPROMISE. "Legislation provides the basic minimum when it comes to safety, but real safety comes from the work we do behind the scenes," explains Kotiranta. Innovations and a competitive edge do not come from just doing things by the book.

"Using shielding gases, recovering vapors released when loading cargoes, and using environmentally friendly paints are just some examples of the latest progress we've made on board our ships."

There is also a clear financial incentive in working for better safety, as does concern about the threat of pollution in the Baltic. |

LAURI VUORINEN

A GRAND FATHER

The Tempera's master, **Lauri Vuorinen**, has worked for Neste Oil since 1975, and been a skipper for 16 years.

"The work's the most satisfying when everything runs smoothly and everyone on board is happy too."

Vuorinen remembers first feeling the pull of the sea at the end of 1960s.

Despite such a long career, Vuorinen has never been involved in an accident at sea.

"And I hope I never will, touch wood. I'll never forget watching the sea of flames that engulfed two tankers when they collided in the dark in the Humber estuary in Britain some years back."

Vuorinen would never like to be without a book on board.

"Even though there's not much time to read, I always like to relax with a good book when I can, even for a few minutes, it clears the mind wonderfully."

Vuorinen became a grandfather for the first time just after Christmas, but he has not yet had time to see his daughter's first-born.

"I'm certainly looking forward to seeing her when I come to the end of my rotation."

NExBTL
[NEXT GENERATION BIOMASS TO LIQUID]

1 What is Neste Oil's NExBTL Renewable Diesel?
NExBTL is a premium-quality diesel fuel produced from renewable feedstocks using Neste Oil proprietary technology.

2 How does NExBTL differ from conventional biodiesel?
NExBTL offers comparable characteristics to conventional diesel fuel and does not suffer from the quality limitations associated with first-generation biodiesel.

3 What's the difference between first- and second-generation biodiesel?
The quality of first-generation biodiesel does not fully match the requirements of automotive and engine manufacturers, and cannot be used in concentrations above 5% of total fuel content. Second-generation Biodiesel offers quality that even exceeds that of conventional diesel fuel.

4 When will NExBTL Renewable Diesel be available?
Production will start in summer 2007 and Neste Oil aims to launch the product later in the year.

5 Can NExBTL Renewable Diesel be used in normal diesel vehicles?
Diesel fuel containing NExBTL can be used without any restrictions, and offers clear environmental benefits.

6 How environmentally friendly is NExBTL?
NExBTL's greenhouse gas emissions are 40–60% lower than those of conventional fossil fuel diesel during the product life cycle. Tailpipe emissions are also significantly lower. Tests carried out by VTT Technical Research Centre of Finland and a number of automotive manufacturers have shown significant reductions in NO_2, particulate, CO, and hydrocarbon emissions.

7 What feedstocks are used in producing NExBTL?
NExBTL Renewable Diesel can be produced from a wide range of vegetable oil and/or animal fat. The process is very flexible in terms of feedstock. All raw materials used are supplied in line with the company's strict sustainability principles, which can be consulted at Neste Oil's website.

INFORMATION provided by **Ilmari Lastikka** and **Sami Oja** from Neste Oil's Biodiesel division.

WHAT OTHER NESTE OIL PRODUCTS OR SERVICES WOULD YOU LIKE TO KNOW ABOUT? SEND YOUR SUGGESTIONS AND QUESTIONS TO REFINE (**SATU.OJALA@KYNAMIES.FI**). A SURPRISE GIFT AWAITS THOSE SELECTED FOR INCLUSION IN THE MAGAZINE.

Full speed ahead in 2020?

The challenges in the workplace are growing all the time: work itself is getting more demanding, the work environment more multidimensional, and competition more international. And in the case of the oil industry, things are getting greener as well. **Where can you find the experts to make all of this a success in the future?**

TEXT NANNA SÄRKKÄ | ILLUSTRATION JUSSI KORHONEN

NESTE OIL is set to recruit a large number of people over the next few years.

"We're going to see a lot of personnel turnover both before and after 2010," says **Harri Turpeinen**, Vice President, Development. "A lot of people are going to be retiring, and our new strategy also calls for bringing new experts into the organization."

ON THE LOOKOUT FOR BIOLOGISTS. Neste Oil's growth strategy, which aims at making the company the world's leading producer of renewable diesel, will be the single most important factor in recruitment.

"Know-how on renewable raw materials will become increasingly important for us. We've already begun to recruit a slightly different mix of people than is typical for an oil company; such as people who understand the natural sciences and biological processes."

Making sense OF CHAOS!

Many people's work environments are likely to become increasingly complicated and involved over the next 15 years. People will find themselves working in different teams and networks, many of them virtual ones as well. Job expectations will rise, as will work loads – and the potential for chaos.

"Multiskilling and the ability to manage different sets of expertise will be essential qualities," believes Project Manager **Tuomo Alasoini** of the Ministry of Labor. "Metaskills, such as creativity, innovation, reflection, and learning will be particularly valuable; as will IT know-how and understanding the ways of the virtual world."

Leaderships and coordination are likely to become more important.

"We will need vision-driven managers who have the ability to communicate common values and mindsets, and motivate people. In contrast to the mechanical work typical of the industrial age, the jobs of the future will require new levels of commitment and motivation. Interpersonal management skills will also be critical: coaching, supporting, and helping. People really will be a critical resource, and will need looking after."

Additional sales and marketing expertise will also be needed to market Neste Oil's new products, particularly through international networks. A global investment program will also call for an injection of additional project management skills.

Neste Oil aims to continue to maintain its high level of conventional refining expertise as well.

"We don't expect to see any areas of know-how disappear, as we'll still very much be in the business of organic chemistry. Our processes will just get more complicated, as our feedstock base becomes broader."

UNDERSTANDING THE PLANT WORLD. "We're doing a lot of groundwork to prepare for implementing our updated strategy," continues Turpeinen. "Looking at what we'll need and where we could face problems. One probable bottleneck that we anticipate is the availability of cost-effective feedstocks. Plants and yields will need to be more productive."

Harri Turpeinen represented Neste Oil on the recent national Finnsight 2015 project, an initiative aimed at reviewing the science and technology-related challenges likely to face Finland over the next 10 to 15 years. Energy efficiency and environmental management were identified as potential competitive strengths for Finland as part of this study.

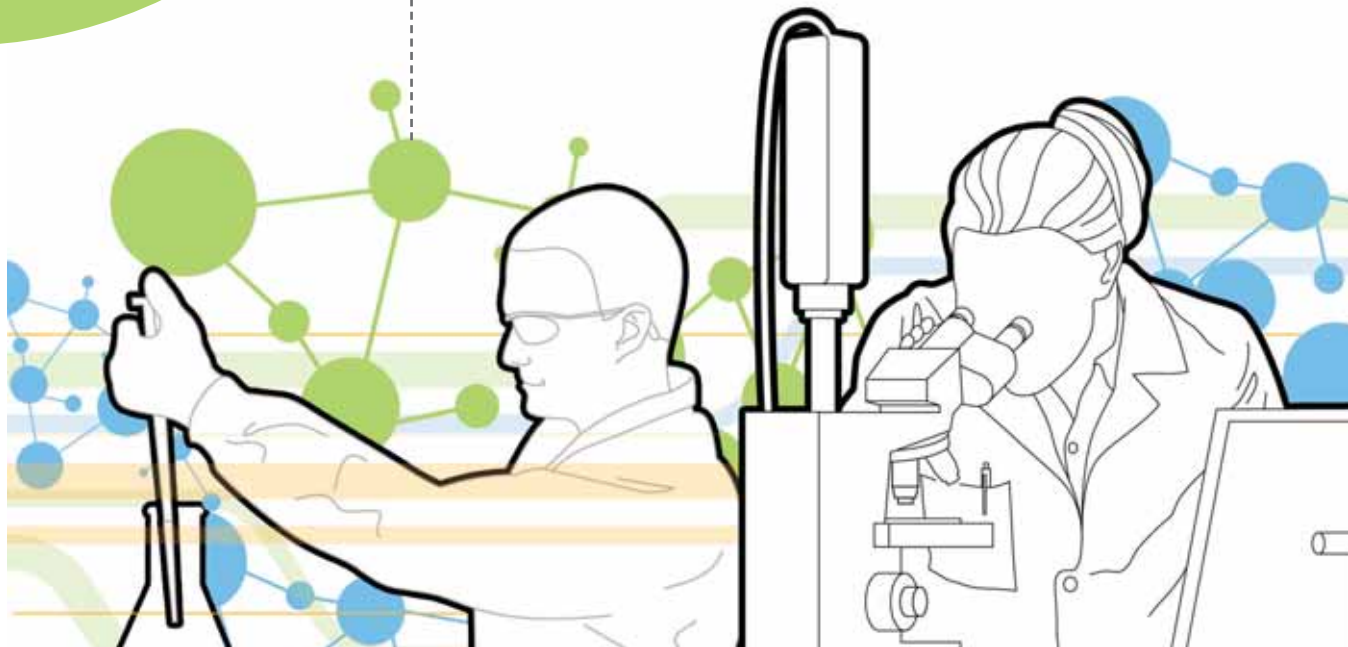
GLOBAL COMPETITION FOR THE BEST TALENT. "Over the short term, one of our most important challenges will be to ensure the successful transfer of existing skills onwards when a lot of our skilled people come up for retirement," says Business Development Manager **Hannu Keränen**.

Neste Oil has prepared for this by reviewing current competence levels.

"We went through our core competences a year ago, and now we're looking at practical skills, and what we need to develop in the Group as a whole, in our units, and among our people. We're aiming to improve our ability to respond to changing needs by increasing job rotation, for example, and through additional training."

A lot of new people will be recruited as well. The priority here will be on really finding the best people for the right jobs.

"In the future, we're likely to see a growing number of companies competing for the same talent," says HR Coordinator **Päivi Saarikko**.



"And competition is becoming more international all the time," continues HR Manager **Tuula Vajavaara**.

"Research and consultancy positions are popular at the moment, thanks to Finland's high educational standards. We could encounter problems in recruiting people for production jobs, though," says Saarikko.

There is a good pool of applicants out there, believes Harri Turpeinen.

"We get a lot of good applications when we recruit, and Neste Oil clearly seems to be an attractive employer. There's perhaps a little bit of a cause for concern in the fact that not so many people are applying to study chemistry and process technology at universities as before. We need to ensure that these subjects continue to generate sufficient enthusiasm."

Neste Oil works with a number of universities and colleges.

"We organize visits and lectures, and we profile Neste Oil in student publications and support student activities. Recruitment fairs are also a good way to meet students, and even find applicants directly," says Saarikko.

EQUALITY OF OPPORTUNITY. Neste Oil received a national award last year for the work it has done in promoting equal opportunity. The company is actively targeting reducing gaps in salaries between men and women and increasing the number of positions where there are equal numbers of both sexes.

"We get a lot of men applying for technical positions, but we've been very encouraged by the growing number of women that are interested in and have the physical 'endurance' for operator work, for example," continues Vajavaara.

Work at Neste Oil is becoming increasingly international, and this is also being reflected in personnel. Thanks to the Internet, the company is becoming better known further afield and applications now come in from around the world.

"Students surf the net a lot, and those in our field contact us to apply for training and diploma positions," says Saarikko.

STAYING ON. Although Neste Oil is generally satisfied with the standard of education provided by universities and colleges, few students are ready to take on responsible positions straight away. The duties of chemists and engineers call for a lot of specialist knowledge – which is why Neste Oil offers extensive internal training programs.

"These are a plus when we're competing for good people. Applicants appreciate training opportunities," says Päivi Saarikko.

"An operator's career, for example, involves a lot of continuous learning," says Turpeinen. "And internal training is particularly important in making the implementation of major changes, such as our biodiesel strategy, a success." |

Simplifying things

Future technological and economic developments will see two different strands of work emerge.

"Creativity and innovation will be essential in jobs calling for special skills. In addition, there will be jobs that don't require extensive training, but which can't be automated or that we don't want to automate, such as care jobs," says **Mika Mannermaa**, a researcher who specializes in future studies.

The importance of time and place will decline. Work will be done when and wherever makes most sense. In the 2020s, people will be able to take everything they need along with them, on their laptop or equivalent.

Specialists will become even more specialist.

"We're likely to see the emergence of 'simplification consultations' to help us survive in an increasingly complicated world. After all, we already have personal trainers to ensure that we exercise correctly and shopping advisers to ensure that we choose the right color necktie."

Understanding and accepting change and diversity will become increasingly important, as the world's dimensions increase and extend.

How to tame a Violin?

Music is the lifeblood and the magic of **Elina Vähälä**'s life. And her Stradivarius is the apple of her eye.

TEXT LIISA JOENSUU
PHOTOS ESKO KESKI-OJA AND DAN PORGES

Elina Vähälä was bewitched by the violin at the age of three, when she saw some children playing on the TV and fell for the instrument straight away. Luckily, her pianist grandmother understood immediately and bought a child's violin for her to start on.

"I attended a music kindergarten and began to take lessons. I used to go into my parents' bedroom first thing in the morning to start off their day with a little music," Elina remembers.

By the age of 12, Elina Vähälä was already playing as a soloist with Sinfonia Lahti, and by the time she was 17 she was one of the founding members of the Virtuosi di Kuhmo chamber orchestra.

"Virtuosi di Kuhmo is very close to my heart, and our series of concerts in Ritarihuone in Helsinki has been a dream come true. Being part of a group like this is a good counterbalance to my solo work, when I also have to travel a lot alone as well."

A DECADE AHEAD. Last year saw Elina's concerts take in the US a number of times, as well as Japan and countries across Europe, and "Finland's own main festivals, including Naantali, of course."

When planning upcoming concerts, Elina uses a 10-year diary. A soloist's career calls for long-term planning and booking concerts years ahead, worldwide. A popular violinist lives a cosmopolitan life, by necessity.

Tall and blonde, Elina's beauty could well have opened up doors for her as a model, but music has always been her thing.

She enjoys traveling, but finds long flights in particular rather stressful, especially when a concert is timed to begin virtually as soon as she steps off the plane. Thanks to her dual American and Finnish citizenships, her numerous visits to the States are somewhat easier to organize, as she avoids visa and security issues that non-US citizens can face, including her husband, pianist **Ralf Gothóni**.

THE RED VIOLIN. **John Corigliano**'s Red Violin Concerto has featured heavily in Elina Vähälä's repertoire recently, and is based on Corigliano's score for the film of the same name.

"It's a truly great piece of music, and I've really grown to love it. It combines much that is traditional with the composer's own unique, modern music language."

Although Elina gives many of her concerts as a solo artist, she sometimes "gets lucky" and gets invited to perform alongside her husband. One piece she particularly likes performing is **Aulis Sallinen**'s Chamber Concerto for violin, piano, and chamber orchestra, which Sallinen composed specially for Elina and Ralf Gothóni.

"Aulis Sallinen dedicated the piece to us, as he had us in mind from the time he started composing the concerto. It's a wonderful, profound piece, and we'll be performing it again this summer at the Naantali Music Festival."

WORKING WITH A STRADIVARIUS. Five years ago the Finnish Cultural Foundation granted Elina Vähälä use of a Stradivarius it owns dating from 1678. She always carries it in her hand luggage whenever she travels.

"Stradivariuses are very individual instruments, and are very different from each other. Each one has its own character, and none

Elina Vähälä and Jaakko Kuusisto practising at Naantali in summer 2005.

Elina Vähälä won first prize at the Young Concert Artists International Auditions Competition in New York **in 1999**, and placed among the best in the Hannover International Violin Competition in **fall 2000**.

of them are easy to tame. The first year with mine brought some very special challenges. When I played in one style, something completely different came out of the instrument. It was really quite a big process to get to know each other!"

NAANTALI'S GREAT. Elina Vähälä loves to perform at the Naantali Music Festival. She is particularly impressed by the ability of its artistic director, **Arto Noras**, to always come up trumps when it comes to attracting artists to the event, and artists who always like performing together.

While enjoying everything that her career has brought her, Elina is also very aware of the responsibility that it brings as well.

"When you've become part of a 'club' like this, you have to give everything you can, and work hard too. I also like to play my favorite pieces again and again, as I can always finds something new about them. It's wonderful to bury myself in them and make new discoveries." |

Sun and Stars

NAANTALI MUSIC FESTIVAL, JUNE 5–17, 2007

This year's Naantali Music Festival will be the twenty-eighth to date, and the program will feature a wide range of chamber music and concerts by leading orchestras and soloists. Neste Oil is among the sponsors of the event, as it has been from its inception.

www.naantalinmusiikkijuhlat.fi

Check out the online version of the article at:
www.nesteoil.com → media → publications → Refine Online

This series of articles will profile the various services Neste Oil offers its customers

"CUSTOMERS APPRECIATE A FAST RESPONSE."

Services

- **Neste Oil's** switchboard numbers: Finland **+358 10 458 11**
- More contact information: **www.nesteoil.com**
- Open **24/7**
- **140,000** calls a year (2006)
- **500–700** calls a day
- Average response time of **five second**
- Peak call time: **8.30–10.30**
- Approx. **30%** of calls are in English.

ONE-STOP SHOP PRINCIPLE → product information → contact information → directions → event programs → SMS and email

Neste Oil,
Good morning...

TEXT JATTA HYTÖNEN

It has been over a year since Neste Oil, as a newly independent company, opened its own switchboard. The focus during the first year of operations has been on developing a core set of customer-friendly services. Quality is as important running a switchboard as it is elsewhere.

The duties of a switchboard have changed quite a lot over the years. People see a switchboard today less as simply somewhere that connects their calls and more as a source of information and assistance on how to reach the company's locations, on events that it is organizing, or email or Internet addresses.

"The switchboard is a portal through which people can access the company's people and its services," says Customer Service Manager Risto Räsänen.

A switchboard is an important interface for a company, as it is often the first point of contact for people, and people have high expectations of such an interface.

"Customer calls are always challenging, as everyone wants their needs met smoothly and efficiently, whatever the time of day."

Modern technology makes the job of customer contact personnel a lot easier than it used to be. Telephone directories are completely electronic today, and provide a lot of extra information. Requests to call a customer back are sent by SMS, and customers can also be served via email.

"In the future, we could even see chat come into the picture as one node of contact. The tools we use will develop, there's no doubt of that, but the bottom line will always be quality of service."

REA LEHTONEN

Neste Oil's switchboard is manned around the clock, and the target response time for every call is five seconds.

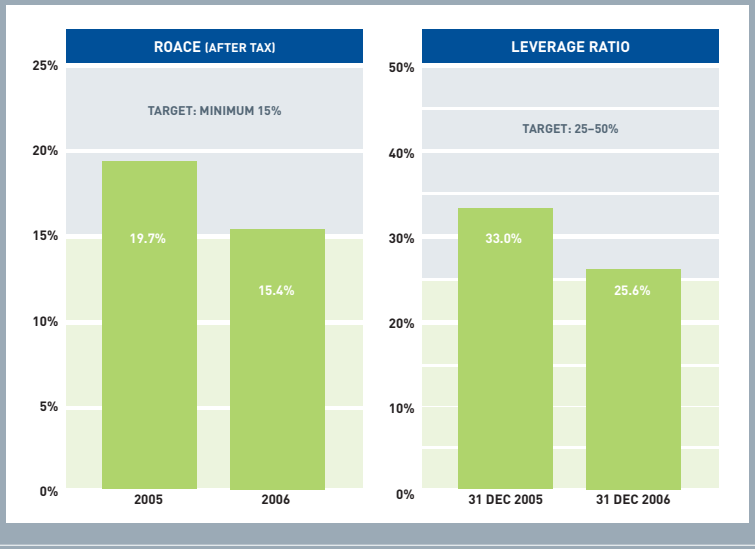
A four-person team is responsible for the switchboard during the day, and is capable of serving callers in a number of languages with a comprehensive range of information.

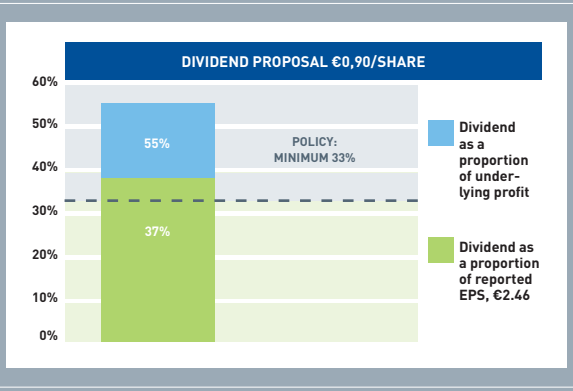
"Our customer service personnel need to know a lot of people across the Neste Oil organization and understand how things are structured and work," says Service Manager Rea Lehtonen. "Without this type of knowledge, it's much harder to provide the level of service we want to. Our people need to be the eyes and ears of the organization.

"Feedback so far has been very positive. This has been confirmed by a study carried out by Informatum recently, which showed that customers are very satisfied with the quality of our service. Clear strengths include a helpful attitude and a good team spirit."

[5 s/24h]

2006





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CONTINUED GOOD PROFIT PERFORMANCE

Neste Oil recorded a comparable operating profit of €597 million, an increase of 5.7% on 2005.

Both the reported and comparable operating profit exceeded the equivalent figures for 2005, despite weaker reference refining margins, particularly in the fourth quarter. The company's net debt fell and its leverage ratio fell to 25.6% compared to 33.0% in 2005. The Board of Directors proposes paying a dividend of €0.90 per share, equivalent to 37% of earnings per share.

Investments in 2006 totaled over €530 million. Mechanical completion was achieved on the new diesel line under construction at Porvoo, and the world's first NExBTL Renewable Diesel plant will enter production in summer 2007.

Neste Oil's share was one of the most traded on the Helsinki Stock Exchange on 2006, and traded between a high of €29.95 and a low of €21.00 during the year.

KEY FIGURES € million, unless otherwise indicated	10–12/06	10–12/05	2006	2005
Sales	2,956	2,752	12,734	9,974
Operating profit before depreciation	207	356	1,007	984
Depreciation, amortization, and imparment charges	40	44	153	153
Operating profit	167	312	854	831
Comparable operating profit	87	114	597	565
Profit before income tax	165	322	841	823
Earnings per share, €	0.54	1.11	2.46	2.60
Capital expenditure and investments in shares	151	184	535	668
Net cash from operating activities	136	272	512	596

	31.12.2006	31.12.2005
Total equity	2,097	1,612
Interest-bearing net debt	722	796
Capital employed	2,890	2,487
Return on capital employed pre-tax (ROCE), %	31.9	37.0
Return on average capital employed after tax (ROACE), %	15.4	19.7
Return in equity (ROE),%	34.3	51.3
Equity per share, €	8.15	6.26
Cash flow per share, €	2.00	2.33
Equity-to-assets ratio, %	48.4	42.4
Leverage ratio, %	25.6	33.0
Gearing, %	34.4	49.4

Strong price volatility

CRUDE PRICES remained high throughout the year, peaking at USD 78.69/bbl in July-August as a result of hurricane season fears in the US. OPEC's decision to cut output, higher refinery capacity utilization, and higher demand in Asia kept prices high for the rest of the year.

The price differential between heavy and light crude was an average of USD 4.28/bbl; and the reference margin for complex refineries in Northwest Europe stood at an average of USD 3.73/bbl (2005: 4.98).

Gasoline prices rose steadily in the first half of 2006, driven by fears of a bad hurricane season, but fell back in July and August. Towards the end of the year, prices were supported by refinery outages and problems in the US that reduced gasoline output and gasoline inventories.

Exceptionally warm weather in the northern hemisphere during the final months of the year reduced demand for heating oil. Demand for diesel fuel and premium-quality lubricant base oil, such as EHVI, continued at strong levels.

Consolidation and competition for market share continued on the oil retail market in Finland in 2006. Growth in demand for traffic fuels continued in Baltic Rim markets.

key indicators

ROACE % = return on average capital employed after tax

$$\frac{\text{Profit for the year (adjusted) + minority interest +interest expenses and other financial expenses related to interest-bearing liabilities (net of taxes)}}{\text{Average capital employed}}$$

EPS = earnings per share

$$\frac{\text{Profit for the year attributable to the equity holders of the company}}{\text{Adjusted average number of shares during the period}}$$

DIVIDEND = share of company profit paid out to shareholders.

CONTACT INFORMATION:

For more investor-related information, please contact IR manager **Antti Nummi**, tel. +358 10 458 11, email: antti.nummi@nesteoil.com

FOR MORE FINANCIAL INFORMATION: www.nesteoil.com → investors

comment

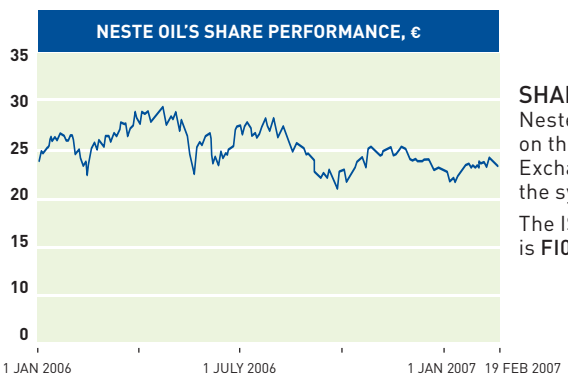
Result comes in slightly below expectations

JUHA ISO-HERTTUA
analyst
ABN Amro

Neste Oil's comparable operating profit for the fourth quarter of 2006 came in slightly below expectations, but was still quite a good result given the state of the market. The unseasonably warm weather had the greatest negative impact on the company's Shipping business, with reduced ice premiums, but this was counterbalanced by better-than-expected results by Oil Retail and Oil Refining.

WEAKER GASOLINE MARGINS from the late summer onwards squeezed the Brent reference margin in the fourth quarter, but high capacity utilization at the Porvoo refinery and excellent base oil margins increased the company's overall margin to nearly USD 6, which was above-expectation.

THE GROWTH IN GLOBAL REFINING CAPACITY looks set to fall short of the expected growth in petroleum product demand this year, which can be expected to further exacerbate the supply and demand balance. Market conditions appear likely to remain favorable for Neste Oil for at least the next two to three years. Together with the startup of the new diesel line, this will probably raise the company's profitability. We continue to consider the Neste Oil share an interesting investment, particularly when the strong performance enhancement that will be contributed by the new diesel line begins to be reflected in the share price. The company's good position on the biodiesel market will also have a favorable impact on long-term prospects.



SHARE =
Neste Oil is listed on the Helsinki Stock Exchange under the symbol **NES1V.**

The ISIN code is **FI0009013296.**

Our mission is to produce the world's cleanest fuel for traffic.
We refine it ourselves and ensure it stays clean all the way
to your gas tank. The more you demand, the better for us.

NESTE OIL