

Air pollution

Climate change may be grabbing the headlines, but the need to reduce local air pollution from burning fossil fuels has not gone away. Real progress has been made over the last 20 years. Companies have responded to regulation with innovative technology. More is needed, particularly in the fast-growing mega-cities of the developing world.

We have 100 years' experience developing innovative fuels and cleaner energy technologies to tackle local air pollution.

Air emissions from our operations

Our contribution starts with reducing the emissions from our facilities that contribute to smog and acid rain – nitrous oxide (NO_x), sulphur dioxide (SO₂) and volatile organic compounds (VOCs). VOC emissions from our operations have dropped more than 50% since 1998 – mainly because we stopped venting associated gas at oil production sites. Our NO_x emissions are also lower, even though we are now using much more energy to refine cleaner fuels. This was due mainly to investments in pollution control equipment, particularly at our Singapore and USA refineries and chemicals plants. SO₂ emissions at our refineries and chemicals plants are also down by almost 10% since 2001. In our upstream business, SO₂ emissions have been rising, mostly because more sour gas (hydrogen sulphide) is being flared in remote locations in Canada and Oman. As a result, Shell's total SO₂ emissions have risen by 8% since 2001. With our help, people living near some of our sites now take part in monitoring the air quality in their communities.

Air pollution from electricity generation

Electricity demand is growing fast. China is adding a new coal-fired power plant every 14 days. While power plants in many places have become much cleaner, power generation still accounts for nearly a quarter of global man-made NO_x emissions and 15% of particulate emissions like soot and smoke. Power from advanced gas-fired plants produces negligible SO₂ and particulates. So increasing our production of natural gas to fuel these plants helps reduce air emissions; so does our advanced coal gasification technology. It dramatically reduces local pollution from coal-fired power plants by converting coal into a synthetic gas that burns as cleanly as natural gas. Driving down the costs of wind and solar power can also help speed the growth of these zero emission electricity sources.

Air pollution from transport

There could be over two billion vehicles on the road by 2050, more than double the number today. Nearly all the growth is expected to come in mega-cities in today's developing world, where air quality is often already poor.

More transport and better air quality can be combined. Investment in cleaner fuels and engines, together with tougher government regulations, have successfully reduced local air pollution from vehicle transport in the developed world. In the EU, for example, VOCs and NO_x emissions from road transport have fallen by more than half over the last 10 years even as vehicle use has grown.

Spreading the use of lead-free and lower sulphur fuels is the first step. They make it possible to introduce modern engines with catalytic converters and particulate traps. These engines

reduce emissions of most local pollutants by over 90%. We no longer produce leaded fuels at any of our refineries (see box) and we were one of the first companies to produce "zero" sulphur diesel on a commercial scale.

We are also one of the leading suppliers of liquefied petroleum gas (LPG), also known as Autogas. LPG offers an option for lowering other local emissions, particularly in developing countries where modern vehicles and low-sulphur fuels are not yet widely available.

Once modern engines and fuels are widely used, further improvements will come from continuing to fine tune engine and fuel technologies to improve fuel efficiency and reduce emissions. This requires more co-ordination between fuel producers and vehicle makers. We are working closely with companies like Audi, Ducati and Ferrari, so that the new engine and fuel technologies needed to reduce emissions further can be developed in parallel. Through such partnerships we intend to become the leading provider of the next generation of cleaner fuels.

Longer-term, hydrogen-powered fuel cell vehicles could provide dramatic reductions in air pollution from transport. Their only local emission is pure water. Shell Hydrogen is also working in partnership with car makers to try to make these vehicles a commercially viable option.

Additional web content:

- Shell's advanced cleaner transport fuels.
- Our coal gasification technology.
- The work we are doing in international partnerships for cleaner fuels in Africa and Asia.

 www.shell.com/airpollution



GETTING THE LEAD OUT

For many years, lead was added to petrol to improve engine performance. It has been phased out in most countries because of health concerns and because lead blocks catalytic converters in modern engines. However, lead phase-out has been a challenge in parts of the developing world. Government-owned refineries sometimes lack the necessary funds to upgrade their facilities. Governments in those countries often have more urgent development priorities. The phase-out of lead at refineries we have a stake in was completed in 2005, when joint venture facilities in South Africa and Kenya ended lead use. We actively support a complete phase-out of lead in fuels through the UN Partnership for Clean Fuels and Vehicles and the World Bank Clean Air Initiative in Africa.

GAS-TO-LIQUIDS FUEL:

PERFORMANCE UP. AIR POLLUTION DOWN.

GTL fuel is colourless, odourless and virtually sulphur-free. Made from natural gas using pioneering Shell technology, it can be blended with diesel and used in existing modern engines.

It produces far fewer local pollutants like particulates, nitrous oxides, sulphur and carbon monoxide, than conventional diesel. This fuel is now used in taxis and buses in some of the world's most congested cities, including Bangkok and Shanghai, where the environmental and health benefits are greatest. GTL fuel can also help improve fuel efficiency.



“VOICES”

Clean, highly efficient engines today are inseparably linked to high-quality fuels. A further reduction of emissions and fuel consumption in the future will require both innovative engine technology and advanced fuels.

Volkswagen and Shell are working closely together on such innovative fuels as second-generation biofuels and synthetic fuels. Renowned awards like the ‘Professor Ferdinand Porsche Prize 2005’ and the first overall victory of a diesel-powered car in the long history of the Le Mans race, which we were able to achieve in 2006 with the Audi R10 using Shell GTL fuel, demonstrate the success of the co-operation.

We will continue to pursue rigorously this course and to offer our customers affordable, sustainable mobility in the future as well. Volkswagen AG has found in Shell a competent, innovative partner for this effort.

Professor Dr Martin Winterkorn
CHAIRMAN OF THE BOARD OF MANAGEMENT OF VOLKSWAGEN AG



Spills

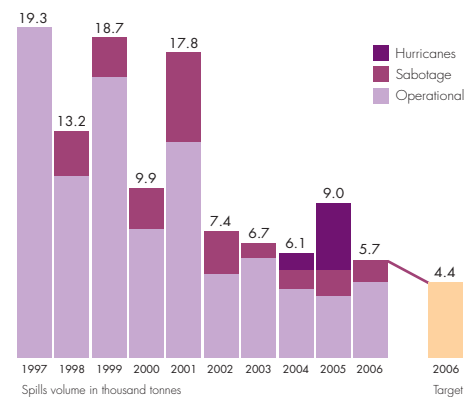
Reducing spills from our operations and ships requires clear procedures, consistent compliance and effective monitoring.

Between 1997 and 2005, the amount of oil and oil products spilled from our operations for reasons we can directly prevent, like corrosion or operational failures, declined gradually. Spills from sabotage or extreme weather, like hurricanes, have fluctuated with events.

Spill volumes from corrosion or operational failures rose slightly in 2006, largely because of two big spills in Nigeria. In the first one, a buried pipeline was damaged while laying another. The second was caused by corrosion. The resulting loss of oil accounted for nearly a quarter of the total amount we spilled in 2006. At sites in Nigeria that were shut down because of the security situation, reliable information about spills will not be available until we return to repair and restart operations. Elsewhere in Nigeria, in areas where we could operate, spills from corrosion and operational failures were at their lowest in seven years as better inspection and repair continued to improve performance.

Outside Nigeria, the number and volume of preventable spills continued to drop last year. In our upstream business, better pipeline inspection and maintenance has reduced preventable spills by almost 60% in Oman, for example, since 2000. In our downstream business, the number and volume of preventable spills were down again in 2006. We are tracking minor leaks more carefully

SPILLS
Thousand tonnes



and fixing their underlying causes earlier at our refineries and chemical plants. Our distribution network has also implemented a programme to proactively prevent spills through more focused inspection and maintenance of pipelines and tanks at storage depots, and through efforts to prevent spills from delivery trucks, particularly in Africa.

In 2006, 22 million tonnes of oil were carried on ships we control. Less than two tonnes were spilled, reflecting our strict operating procedures.

Additional web content:

- Our efforts to further improve asset integrity (including spills).
- Spills performance in Nigeria in the Shell in Nigeria Environment and Society Report.

www.shell.com/spills

