CO_2 capture technology

The world is demanding much more energy for development (which currently means more fossil fuels) and a solution to climate change. It cannot have both unless safe and cost-effective ways are found to capture and store CO_2 from coal, oil and natural gas.

There are many technical options for capturing CO_2. Once it is captured, CO_2 can then be stored underground (in aquifers or in some oil and gas fields). It can also be used in industrial processes. However, capturing and storing CO_2 is energy intensive and expensive. At a medium-sized coal-fired power plant, for example, capture and storage would lower the plant's overall energy efficiency by about 10% and add several hundred million dollars to investment costs. Storage will also require acceptance by planning authorities and by local communities.

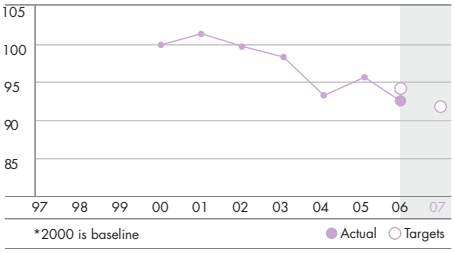
We are involved in large-scale demonstration projects in this area. One of these is ZeroGen, a low CO_2 coal-fired power project being considered in Australia (see box). Another, in Norway, is the largest offshore project to date to store CO_2 and use it to enhance oil recovery. If it were to go ahead, the Halten project, which we are working on together with the Norwegian Government and Statoil, would solve a power shortage in central Norway and reduce CO_2 emissions by up to 2.5 million tonnes a year. Both projects are at the feasibility stage.

We are also supplying waste CO_2 from our Pernis refinery to greenhouses in the Netherlands and exploring CO_2 management opportunities in the Middle East with Mitsubishi Heavy Industries.

Government policy will play a decisive role in determining the future of CO_2 capture and storage. The significant additional investment involved means it will not be rolled out on a large scale without government action. At the moment, emission reductions achieved through capture and storage do not qualify for emission credits. Our appeal is for more effective project permitting and measures to reduce costs, for example through the European Technology Platform for Zero Emission Fossil Fuel Power Plants. These include granting carbon credits for captured CO_2, and setting emission targets beyond 2012 to create a stable long-term investment framework.

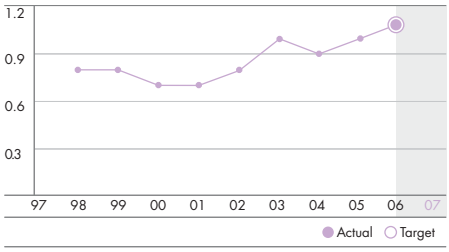
KENERGY INTENSITY – IN OUR CHEMICAL PLANTS

Chemicals Energy Index*



KENERGY INTENSITY – IN EXPLORATION & PRODUCTION

Gigajoule/tonne production



Winner of the Shell Eco-marathon 2006. A biofuel-powered prototype which won with an energy consumption equivalent to 2,885 km/l of petrol.

MONOTOWERS: LEARNING FROM OUR ALTERNATIVE ENERGY BUSINESS

In 2006, we began operating the world's first offshore natural gas production platforms powered by wind and solar electricity. This lightweight, low-cost and zero-emission platform – called a monotower because it stands on a single leg – is based on the design used for offshore wind turbines. Monotowers make it possible to tap small natural gas fields in the North Sea that would be uneconomic with traditional equipment. Developing these fields helps increase and diversify energy supplies by extending the production life of mature regions like the North Sea.

We began operating two monotowers in 2006. Each platform uses just 1.2 kilowatts of power per day. That is less than it takes to boil a kettle and much less than the 30 kilowatts needed to operate a traditional unmanned platform or the 40 megawatts that a full-size, manned facility requires.