The oil and gas industry

from Rio to Johannesburg and beyond

Contributing to sustainable development

OGP
International Association of Oil & Gas Producers

IPIECA
International Petroleum Industry Environmental Conservation Association

This report has been prepared by the International Petroleum Industry Environmental Conservation Association (IPIECA) and the International Association of Oil and Gas Producers (OGP) through a joint Task Force. Individual oil and gas companies, members of IPIECA and OGP, have provided the case studies and much background material. The United Nations Environment Programme (UNEP) facilitated a multi-stakeholder consultation process that provided comments on a preliminary draft of the report.

IPIECA/OGP Task Force Members included:

Kit Armstrong (ChevronTexaco)
Jean-Paul Boch (TotalFinaElf)
Frede Cappelen (Statoil)
Jeff Chapman (ExxonMobil)
John Campbell (OGP)
Sophie Depraz (Project Manager, IPIECA)
Brian Doll (ExxonMobil)
Aart Gaasbeek (Shell)
Bill Hannenberg (ExxonMobil)
Miriam Lev-On (Task Force Chair, BP)
Garry Mann (Nexen Inc)
Anton Moldan (South African Oil Industry Environment Committee)
Foo Say Moo (Petronas)
Chris Morris (IPIECA)
Liz Rogers (BP)
Lloyd Slater (OGP)
Richard Sykes (Shell)

IPIECA and OGP Company and Association Members

The membership rosters of IPIECA and OGP span the globe, including major oil and gas corporations, the contracting and supply companies that serve them and industry trade associations. Between them IPIECA and OGP members account for more than half of the world's daily output of oil.

Abu Dhabi National Oil Company • Agip Kazakhstan North Caspian Operating Company • Amerada Hess
American Petroleum Institute (API) • Anadarko Petroleum • Association of German Oil and Gas Producers (WEG)
Associazione Mineraria Italiana • Australian Institute of Petroleum (AIP) • BG Group • BHP Billiton • Bitor • BP
Cairn Energy • Canadian Association of Petroleum Producers (CAPP) • Canadian Petroleum Products Institute (CPPI)
ChevronTexaco • CNOOC • CONCAWE • Conoco • Dansk Olie og Naturgas • Denerco Oil • ENI • Enterprise Oil
European Petroleum Industry Association (EUROPIA) • ExxonMobil • Greater Nile Petroleum Operating Company
Gulf Area Oil Companies Mutual Aid Organisation (GAOCMAO) • Halliburton • Hocol • Institut Français du Pétrole (IFP)
Institute of Petroleum • Irish Offshore Operators' Association • Japan National Oil Corporation • Kuwait Oil Company
Kuwait Petroleum Corporation • Mærsk Olie og Gas • Marathon Oil • Metasource (WOODSIDE)
Netherlands Oil and Gas Exploration and Production Association (NOGEPA) • Nexen Inc. • Norsk Hydro
Norwegian Oil Industry Association (OLF) • Occidental Oil and Gas Corporation • OMV
Oil Companies International Marine Forum (OCIMF) • Pertamina • PetroCanada • Petróleo Brasileiro • Petróleos de Venezuela
Petróleos Mexicanos • Petroleum Development of Oman • Petroleum Association of Japan (PAJ) • PETRONAS
Phillips Petroleum • Premier Oil • PTT • Qatar Petroleum • Ras Laffan Liquified Natural Gas Co
Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean (ARPEL) • Repsol YPF
Saudi Aramco • Schlumberger • Shell • SONATRACH • South African Oil Industry Association (SAPIA) • Statoil
TotalFinaElf • UK Offshore Operators Association (UKOOA) • UNOCAL • Veba Oil and Gas • Yukos

Please note that when this report refers to 'the oil and gas industry' or 'the petroleum industry' or uses the first person plural, it means to encompass only those companies and organizations that are members of IPIECA and OGP.

Design and production: Words and Publications, Oxford, United Kingdom • www.words.co.uk
Photographs: cover, top row, left: Dominique Halleux/Still Pictures; centre: John Kieffer/Still Pictures; right: Mike Schroder/Still Pictures; middle: Cyril Ruoso/Still Pictures; bottom row, left: Mark Edwards/Still Pictures; right of centre: Digital Stock Corporation; right: Mark Edwards/Still Pictures • lower front cover/page 4: Photodisc Inc. • page 5, left: Photodisc Inc.; map: Mountain High Maps®Copyright©1993 Digital Wisdom Inc. • page 8: FAO • page 11, top, upper left & lower left: Photodisc Inc.; upper right: Ron Giling/Still Pictures • page 12, all except centre right: Photodisc Inc. • pages 13 & 14: Photodisc Inc. • page 33, right: Chris Stowers/Panos Pictures • page 50: Photodisc Inc. • page 51: Edgar Cleijne/Still Pictures • page 62: Neil Cooper/Panos Pictures • page 68: John Kieffer/Still Pictures • pages 72 &77: Photodisc Inc. All other images courtesy of IPIECA/OGP member companies unless otherwise stated.

The oil and gas industry

from Rio to Johannesburg and beyond

Contributing to sustainable development

IPIECA

International Petroleum Industry Environmental Conservation Association

2nd Floor, Monmouth House, 87–93 Westbourne Grove, London W2 4UL, United Kingdom

Telephone: +44 (0)20 7221 2026 Facsimile: +44 (0)20 7229 4948

E-mail: info@ipieca.org Internet: www.ipieca.org

OGP

International Association of Oil & Gas Producers

London office

25/28 Old Burlington Street, London W1S 3AN, United Kingdom

Telephone: +44 (0)20 7292 0600 Facsimile: +44 (0)20 7434 3721

E-mail: reception@ogp.org.uk Internet: www.ogp.org.uk

Brussels office

Boulevard du Souverain 165, 4th Floor, B-1160 Brussels, Belgium

Telephone: +32 (0)2 566 9150 Facsimile: +44 (0)2 566 9159

© IPIECA/OGP 2002. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior consent of IPIECA/OGP.

This publication is printed on paper manufactured from fibre obtained from sustainably grown softwood forests and bleached without any damage to the environment.

OGP
International Association of Oil & Gas Producers

IPIECA
International Petroleum Industry Environmental Conservation Association

Contents

Biodiversity

Climate change

Engagement and community outreach

Ethnics and human rights

Health management

Oil spill prevention and response

Product stewardship

Safety

Technology cooperation and capacity building

Urban air quality

Waste management

Water management

Part 1: The international oil and gas industry—an overview

4 Introduction
5 Why the need for concern?
5 What we do and how we do it
7 A positive impact
8 Lasting benefits
9 The challenges ahead

Part 2: Key issues

14 Biodiversity
20 Climate change
26 Engagement and community outreach
31 Ethics and human rights
35 Health management
38 Oil spill prevention and response
44 Product stewardship
48 Safety
52 Technology cooperation and capacity building
58 Urban air quality
64 Waste management
68 Water management

Annex 1

72 Examples of oil and gas industry achievements according to Agenda 21 chapters

Annex 2

77 IPIECA publications and workshops
78 OGP publications and workshops

Foreword

For some, the very notion of oil and gas development within the context of sustainability is a contradiction. For others, the idea provides an opportunity for dialogue, consensus and creativity.

This is consistent with one of the most important lessons our industry has learned in the past decade. Ways of thinking that have spawned modern technology do not necessarily provide all the answers to contemporary problems. However, that technology can be a powerful instrument for good when used with care.

That is what this report is about. It shows how, working within local cultures, the oil and gas industry is helping to produce more affordable, accessible and increasingly cleaner energy than ever before. This energy—currently 63 per cent of the world's primary needs—is a source of heat, light, mobility and communications for billions of people around the world.

Moreover, we are striving to produce vital oil and gas in ways that are responsible and ethical, within acceptable limits of environmental impact.

This document is an expanded version of the oil and gas industry sector report published by the United Nations Environment Programme (UNEP) for the World Summit on Sustainable Development in Johannesburg. Free of the constrictions of space and conformity dictated by a multi-sector report, it has been designed to be easy to read, with more illustrations and graphics. The text is identical to that published by UNEP, which was subject to their stakeholder consultation process. The industry thanks all those stakeholders who read and commented on the report.

IPIECA and OGP are also grateful to UNEP for having given us the opportunity to explain our industry's achievements and challenges in the context of sustainable development.

Randy Gossen
IPIECA Chairman

Wolfgang Schollnberger
OGP Chairman

Part 1

The international oil and gas industry—an overview

Introduction

Ten years after the world summit on sustainable development in Rio de Janeiro, as heads of state, civil servants, journalists, NGO representatives and business leaders converge on Johannesburg for another landmark meeting, there will be no shortage of points of view. These will be aired, examined and argued from an infinite variety of perspectives.

There is, however, one common thread uniting the delegates in all their diversity: each and every one of them, along with billions of other people around the world, relies on oil or gas in some form or another to provide the power to keep them mobile, nourished, comfortable, safe, well-lit and in communication with each other and the rest of the world 24 hours a day.

With the spread of prosperity, world demand for hydrocarbons is increasing. Today we use around 75 million barrels per day (mbd) of oil, and daily consumption of gas is 220 billion cubic feet (bcf). By 2010, even with modest economic growth, world consumption is expected to rise to 90 mbd of oil and 280 bcf of gas per day.

Looking ahead to further summits over the next several decades, the oil and gas industry faces challenges as well as opportunities. Every day some 250,000 citizens will be born—each requiring clean and affordable energy to provide the basics of life. Admittedly, the future might not see the same degree of dependence on oil and gas as alternative and renewable energy sources become more practical and widely applicable. That process is accelerating and the oil and gas industry is playing a significant part in the daunting task of researching, producing and manufacturing a range of economically viable, socially acceptable and environmentally sound energy options.

For the time being, though, oil and gas remain two of the most important fuels driving the engine of global prosperity. This prosperity is closely linked with the globalization to which Nelson Mandela referred during a lecture at the British Museum on 16 November 2000:

> *"We welcome the process of globalization. It is inescapable and irreversible. We can no more ignore it than we can reject the idea of winter by refusing to wear warm clothes. It can carry with it not only investment and transfer of expertise, but also knowledge and understanding of other people and cultures …"*

However, as modern South Africa's founding father went on to caution:

> *"… if globalization is to create real peace and stability across the world, it must be a process benefiting all. It must not allow the most economically and politically powerful countries to dominate and submerge the countries of the weaker and peripheral regions. It should not be allowed to drain the wealth of smaller countries towards the larger ones, or to increase inequality between richer and poorer regions."*

The oil and gas industry acknowledges this. Just as we acknowledge the value of integrating environmental, health and safety considerations into our business processes. Similarly, we are aware of the need to be responsive to our employees, customers, contractors, shareholders and the communities in which we operate.

Why the need for concern?

The world has moved on in the past decade, and so have we. One of the drivers has been the demonstrable relationship between economic growth and greater social well-being and quality of life.

What does this mean for oil and gas corporations? Our businesses have been designed to generate financial benefit to their shareholders. That obligation remains. At the same time, society must benefit as well. These benefits include the standard list of economic activities: wages for employees; taxes and royalties to governments; jobs and economic activity for suppliers, contractors and local communities; and the introduction of more efficient technology. Our obligation is to engage in these activities the best way we know how.

As public awareness grows, our business success is linked to performance in the areas of environmental protection and community affairs. Consequently, concerns in these areas, including assessments on potential social impacts of our activities, are factored into our decision-making processes. IPIECA and OGP have developed a wide variety of guidance and 'best practice' documents (see box below) and are currently working together to develop an approach that could be used in managing social issues in oil and gas projects.

Principles of Social Impact Assessment

One of the most significant 'best practice' documents published by OGP was the 1997 report outlining the Principles of Social Impact Assessment. IPIECA subsequently endorsed this report and both organizations are developing a more detailed document describing some of the social issues that might arise during an oil and gas project. Among these are:

- legal and other agreements;
- safety and security;
- consultation and information disclosure;
- resettlement;
- cultural resources;
- employment and labour actions;
- local economic development, housing and community issues;
- national infrastructure and utilities; and
- health.

As part of the review process for *The Oil and Gas Industry: from Rio to Johannesburg and Beyond,* IPIECA and OGP sought comments, through a UNEP-facilitated process, from a range of stakeholders, including non-governmental organizations, regulators and funding institutions. Many of the comments received have been incorporated into the final version.

Society and governments have the role of balancing economic, social and environmental goals. That being said, we cannot—and should not—take on the role of governments. There are limits to what operators in our industry can do. We are companies, and we are mandated to comply with the rule of law and regulations and to work in partnership with local authorities and communities to ensure sustainable benefit to all.

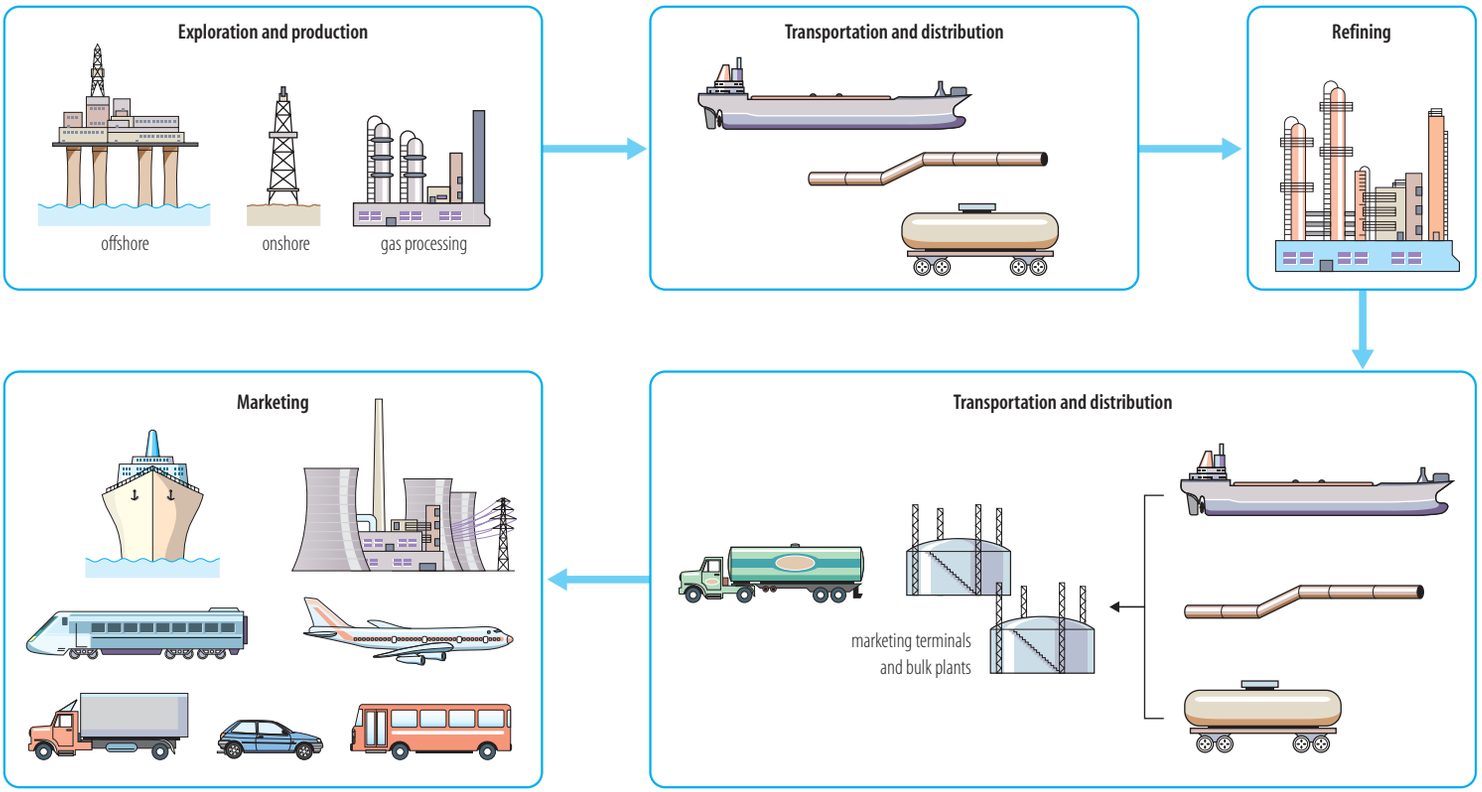
Ten years after Rio, the oil and gas industry, governments and society are working more closely together than ever before. In all likelihood, the Johannesburg Summit will accelerate this process even further.

Meanwhile, this report looks at what the oil and gas industry has accomplished within the context of sustainability in the past decade. Specific links between our major achievements and the chapters of Agenda 21 can be found in Annex 1. This report also looks at some of the challenges we face in the decade ahead and beyond.

What we do and how we do it

Our aim is to provide safe, accessible and economically viable fuels that are essential to economic growth, environmental protection and social progress. Since the Rio 'Earth Summit' in 1992 we have consistently maintained oil and gas supplies while continuously reducing costs and solving ever more difficult technological challenges. As those tasks have become greater, the industry has seen major structural changes—mergers, acquisitions, companies entering or leaving a country or region. Nevertheless, we retain our diversity in terms of size, structure and governance. Whether

The oil and gas industry process



small, medium or large, state-owned or publicly held, oil and gas companies are alike in risking enormous capital investments that can take years to show the first signs of a return. Many oil and gas projects that were just being considered during the Rio Summit are only now beginning to bear fruit. Others are still waiting for the day they may become viable. The work we do is increasingly complex. So are the demands society makes on us. That is why the oil and gas industry is progressively integrating business imperatives, technology deployment, capacity building, social responsibility and environmental protection as part of coherent processes common to all our activities.

"For too long, environmentalists and industrialists alike have seen a false trade-off between environmental protection and economic growth. We must introduce a new way of thinking—one that sees economic and environmental health as interlinked, mutually supportive goals."

Nitin Desai
United Nations Undersecretary-General for Economic and Social Affairs

Conditions, laws and regulations differ widely around the world, which often means country-specific or even site-specific solutions are most effective. Nevertheless, our industry is moving in the direction of corporate environmental, social, health and product stewardship policies that have global objectives and applications.

Improved corporate policies and implementation strategies are also playing their role in making better operators of the companies that form our industry. For instance, more companies are now adopting a corporate environmental policy across all operations. These policies form the basis for performance objectives and the mechanisms for tracking progress in achieving these objectives. Implementation of an environmental policy usually involves local communities in the decision-making process for issues that affect them.

A combination of technological advances and innovative approaches characterize much of what we do:

- In the search for oil and gas, for example, techniques such as 3-D and 4-D seismic work enable us to map geological formations

in far greater detail than before and, in some cases even predict whether they contain oil and/or gas. This increases our success rate in drilling and so minimizes the number of wells drilled and the materials consumed in the process. Comparing today's activities to those of 15 years ago, fewer than half as many wells are required to add the same volume of reserves. Those wells tend to have slimmer holes, using less materials and chemicals.

- Other techniques, such as horizontal and directional drilling, have revolutionized the extraction process and reduced impacts to surface areas. Fewer wells mean fewer drilling sites or platforms. The end result: less environmental impact per barrel of oil produced.
- In downstream operations (refining and distribution) we are making great strides. In waste management, the practice of recycling refining residuals and converting coke is spreading. In addition, collection and re-refining of 'off spec' products result in converting what would otherwise be waste into clean and valuable products.
- We are also paying strong and focused attention to our end products. One of the most notable achievements of the past decade has been the reduction of emissions from end users of oil and gas. Cleaner conventional fuels (e.g. no lead, lower sulphur) with more effective additives yield lower emissions from motor vehicles and stationary end users. Continuing work on advanced lubricants reduces friction and lengthens refill intervals. This improves fuel economy and minimizes waste generation.

In some cases, the industry can take a leadership role in ensuring the benefits of these advances are available globally. IPIECA, for example, is working with the auto industry and several intergovernmental organizations to encourage governments around the world to phase out leaded gasoline in those areas where it is still used.

A positive impact

It is impossible to overestimate the social and economic impact of the global oil and gas industry. For example, recent World Bank figures show annual oil and gas incomes of around $35 billion for Mexico, $30 billion for Venezuela and $22 billion for Nigeria. Such incomes bestow enormous potential for good—and equally immense temptations for abuse.

Health, safety and environment management systems

The global oil and gas industry has pioneered the use of health, safety and environmental (HSE) management systems to focus resources—time, energy and finances—and ensure measurable performance with continuous improvement. Many companies in the industry have certified such management systems in line with public standards such as those of the International Organization for Standardization (ISO) and the EU-based system EMAS. Others have calibrated their management systems to comply with these standards. Additionally, the industry itself has developed a series of HSE guidelines over the past ten years. In several cases, these guidelines have been adopted by governments as a basis for their own environmental regulations. ARPEL guidelines for the oil and gas industry in Latin America and the Caribbean are an example. Other regional and national associations are equally active.

For instance, the American Petroleum Institute (API) is the industry organization for the world's largest single consumer of oil and gas. Its scope of activities reflects this. For more than a decade API has been compiling data on the environmental, health and safety performance of the US oil and gas industry. In addition to this material, API also collects information provided by member companies to various governmental agencies. The aim is to provide a simple means for communicating the industry's overall environmental performance. Efforts are currently under way to enhance access to this vital information for a wider global audience through an expanded API website.

Specific activities of API as well as other national and regional associations including CAPP, AIP, CONCAWE and UKOOA are highlighted in the following pages.

On a worldwide basis, both IPIECA and OGP have also been instrumental in promoting best practices in these areas. OGP's Management System Guidelines provide upstream companies with valuable insights into the best ways of achieving improved HSE performance, no matter where they operate. IPIECA's *A Common Industry Approach to Global Standards* promotes the concept of 'standards that are appropriate to each specific environmental, social and economic context within which the industry operates, using a risk-based decision-making process.'

Globally, it is easy to count the number of barrels of oil and gas equivalent produced. In 2001 the figure was 40 billion. But how do you determine the social and economic impact of producing and using that energy?

Employment is one gauge. Millions of people worldwide rely directly on the oil and gas industry for their livelihoods. According to the International Labour Organization (ILO):

"... each job in production or refining generates from one to four indirect jobs in industries that supply the needed inputs and that benefit from the value added by oil/gas activities. In the sense that the overall economy requires suitable and reliable energy supplies, the employment effects of these sectors are even greater and extend throughout the economy."

In other words, it is hard to imagine any industry or sector that does not depend in some way or another on oil or gas products or derivatives for fuel, transport or raw materials.

Another way to determine impact is revenue management. In Brazil, for instance, oil and gas revenues are mandated by law to be shared with local communities. In Campos, revenues received by the city are used to construct hospitals and clinics, provide paved roads and modern sewer systems, and place street children in schools, not only to provide an education but to help save them from a life of child labour. Similarly, in Alaska, a substantial proportion of government revenues from the North Slope oil production goes to native communities.

In all producing countries the oil and gas industry generates royalties and revenue sharing funds. In many consuming regions, the use of fuels provides the taxation framework on which governments rely.

Does this mean that the social and economic impacts of oil and gas are invariably favourable? Unfortunately not. There are some nations, regions and communities that have not gained as they should or could have done from the development of their oil and gas reserves. This is sometimes referred to as the 'paradox of plenty,' when the potential benefits of oil riches are squandered through inefficient investments, government waste and corruption.

The question to ask is why have some countries benefited from oil and gas resources while others have not? Economists, political scientists and others have offered a number of possible reasons. While there is no consensus on the answer, the dilemma is clear. So it is imperative that industry, governments and other stakeholders dispassionately examine and understand the mistakes made in the recent past and work to take inspiration and guidance from the decade's successes.

There is no shortage of those successes. People who, as a result of our activities, now enjoy access to clean water for the first time in their lives, whose children are being inoculated and protected from disease, and who are benefiting from industry-supported HIV/AIDS programmes are probably the best qualified to determine the positive impact of oil and gas development on their own lives.

They are among the most important beneficiaries of a wider industry focus, a greater sense of responsibility to society at large that has marked our industry's activities in the past decade. Today, this drive towards a wider corporate social responsibility is gaining momentum.

That being said, there are still disconnects between the industry's perception of our responsibilities and what others (a number of communities, governments, NGOs and even employees) think should be our responsibilities. This is an issue that can only be addressed collectively through mutual understanding and shared action. We are committed to finding ways to bridge the apparent gap.

Lasting benefits

Technology development, transfer and capacity building form an integral part of the oil and gas business and are a major area in which the industry contributes to economic development and generates wealth for society at large.

Technologies introduced to host countries include a myriad of industrial production and manufacturing processes along with the infrastructure needed to distribute energy products

to local consumers. This transfer of knowledge also includes novel technologies to control or reduce environmental impacts of activities and products. We promote technology transfer directly and through a variety of partnerships.

Capacity building encompasses the management systems and skills required to operate complex equipment and technology safely and efficiently and to improve business performance while protecting the environment and helping communities to develop. For economic growth to be sustainable—and benefit all—governments need to combine policies that promote a vibrant private sector, provide education and health care for all and maintain a framework of justice and security. Effective states and efficient markets work best in tandem.

Both technology transfer and capacity building depend on all these factors—and more. Also needed are an appropriate enabling environment and reliance on diverse partnerships that embrace industry, local communities, governments and NGOs. IPIECA and UNEP have jointly published a report entitled *The Oil Industry Experience: Technology Cooperation and Capacity Building—Contribution to Agenda 21*, which illustrates some of our industry's successes—as well as lessons learned from such partnerships.

All of this narrows down to a simple reality: around the world, oil and gas companies are striving to operate their locally registered companies by employing and training local people at every level and to encourage locally sustainable businesses, all of which increase society's capacity to realize economic and other benefits from oil and gas operations.

The challenges ahead

In the past 10 years, despite wars, natural disasters and economic volatility, the oil and gas industry has kept the world supplied with the raw materials and products it needs. Given an enabling environment—one that encourages investment and risk taking—we are confident in our continuing ability to meet the globe's energy needs for decades to come.

On what do we base this confidence? At the most conservative estimate, the world's ultimate conventional oil recovery (including past production of around 800 billion barrels) is around 1800 billion barrels. Estimates from the International Energy Agency are more optimistic at around 2300 billion barrels of oil as a result of technological progress. In terms of natural gas, resources are even more extensive. Only some 20 per cent of estimated world total natural gas supplies have so far been found. Huge supplies remain in many different parts of the globe.

Does that mean business as usual for the oil and gas companies? Far from it.

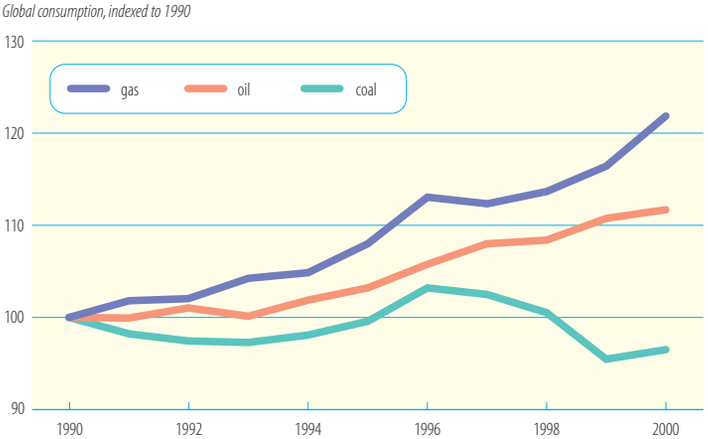
In concentrating on securing future supplies of oil and gas we have perhaps paid less attention to other, equally important aspects of our business. As a result, we are sometimes perceived as arrogant, topdown, non-participative polluters, more interested in providing cheap energy to developed nations than fostering long-term prosperity elsewhere. Because the scale of our operations can dwarf entire national economies, we have been criticized for failing to use that clout as an instrument for positive change.

Clearly, the oil and gas industry has unfinished business in our dealings with governments, local communities, relevant NGOs and multilateral agencies. As part of doing business better in the 21st century, we will have to

Below: as energy use continues to increase, the oil and gas industry is confident in its ability to meet future energy needs.

Energy markets: primary energy mix

Global consumption, indexed to 1990



Source: BP Statistical Review

take into account changing attitudes, shifting priorities and newly emerging environmental, economic and social concerns.

Continuing security of supply apart, key strategic issues to be addressed in fuelling economic and social growth include: energy substitution, diversification of the energy portfolio and energy efficiency. The next decade and beyond will see significant changes in energy production and the way the world uses it. The oil and gas industry is playing a positive and important role in making those changes happen.

We foresee many challenges, including:

- making the right decisions on emerging technologies, particularly in the areas of renewables, hydrogen and fuel cells to achieve diverse, secure and clean energy supplies;
- preventing pollution during the exploration, production, transportation, refining and marketing phases of our industry—and dealing with the legacies of past pollution in soil and water;
- improving the social dimension of our business in meaningful and measurable ways that help to broaden the benefits of wealth creation and so contribute to the alleviation of poverty;
- working and consulting more effectively with others outside our core areas of expertise, including governments, communities and NGOs; and
- conducting all of our operations with greater degrees of transparency, accountability and the correct use of resources.

Though admittedly we have a long way to go, we have already started to confront many of these challenges. We are confident that enhanced opportunities to deal with these and newly arising issues will evolve as the industry's ability to work together within our sector—and, just as important, with others outside our business—improves. In the years to come, we hope to devise ways that enable us to handle important issues collectively with interested parties, implementing joint plans of action that lead to enhanced global performance.

Both IPIECA and OGP are working with member companies to exchange information more effectively with other global and regional associations to improve the sustainable nature of the industry's operations. Certainly, we are not there yet. And we can never cooperate to the extent that working together undermines national and international laws on competition.

Nevertheless, we readily acknowledge that as individual companies—and as an industry—we do not always have the right answers. Sometimes, we do not even ask the right questions. Therefore, probably the biggest challenge we face is in working more closely and effectively with others; listening to and learning from diverse points of view.

This process has only really begun in the past decade, but already the benefits are apparent. A few of these successes are briefly described in the following pages. Many have been omitted in the interests of brevity. Many more are yet to be achieved. But soon they will be. More than ever before, the oil and gas industry is determined to reach greater levels of involvement and cooperation with the rest of civil society. It is the only way forward.

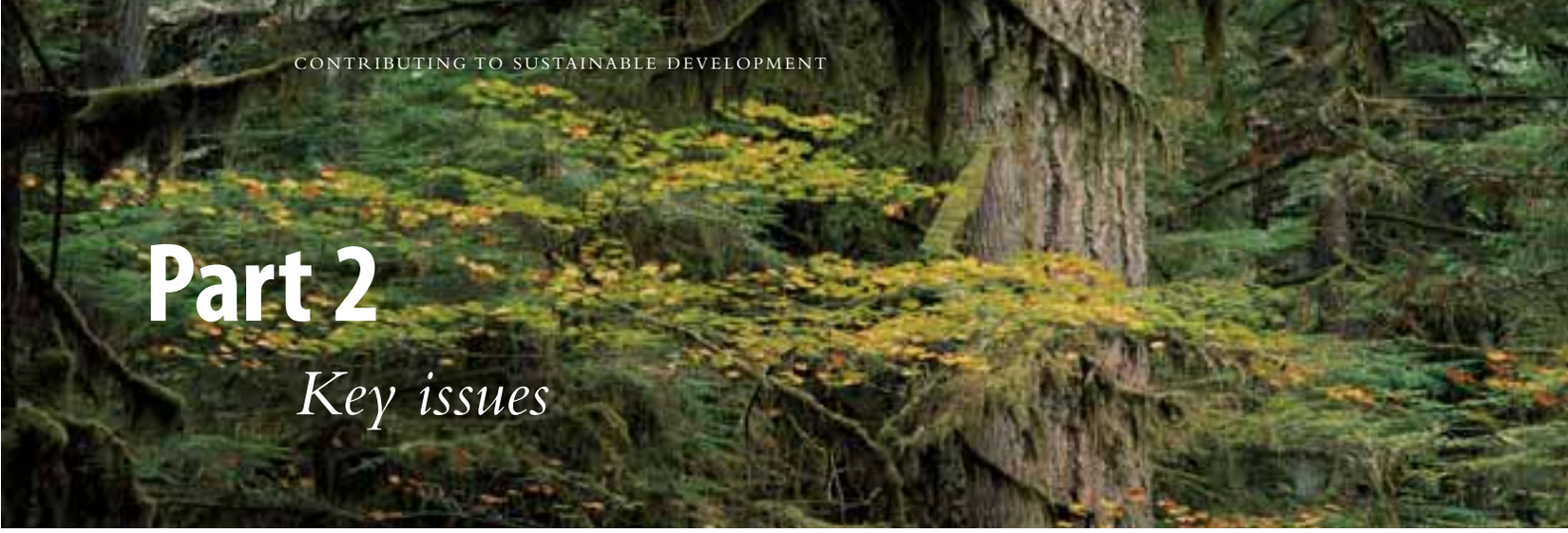
IPIECA and API on corporate reporting

API and IPIECA are collaborating on a new environmental, health and safety (EHS) and sustainability reporting initiative to develop a tool that companies and associations within the oil and gas industry can use to improve the quality, scope and completeness of reporting in ways that meet the needs of key stakeholders.

IPIECA's Strategic Issues Assessment Forum established a task force to lead a 'Joint Corporate Reporting Compendium Project' that will characterize the current state for both EHS and sustainability reporting. Overall objectives are to:

- help stimulate exchange of information between companies and industry associations on both EHS and sustainability reporting practices;
- identify company performance indicators, reporting practices and policies; and
- enhance the understanding of stakeholder expectations in corporate reporting.

The main product of this initiative will be an 'evergreen' web-based compendium that helps companies continuously monitor where they stand in respect to EHS and sustainability reporting trends. The compendium will provide information about EHS and sustainability reporting policies, practices and performance indicator definitions—all within a context for comparison with other guidance publications, such as the Global Reporting Initiative. Completion of this project is expected in late 2002, and will be marked by a workshop to discuss results and recommendations.



Part 2

Key issues

The bulk of this report is devoted to a closer examination of some key issues. It also includes specific examples of the ways in which we are tackling these challenges. All of these issues are important. They are listed and explored in alphabetical order.

● *Biodiversity* *(see page 14)*

Human activities inevitably impinge on other species. As an industry that operates in tropical rainforests, wetlands, deserts and arctic tundra—as well as industrial complexes, inner cities and busy roadsides—we must be particularly sensitive to biodiversity. That is why our operations—whether at sea or on land—are specifically designed to coexist with habitats important to a variety of biological species and, wherever possible, to minimize interactions. In the past decade developments in 3-D and even 4-D seismic work and directional drilling have significantly reduced the footprint of our operations in sensitive areas.

● *Climate change* *(see page 20)*

The oil and gas industry acknowledges and participates in the climate change debate. More than that, we have a strong record on reducing greenhouse gas (GHG) emissions from our own operations through the development and implementation of advanced technologies that are not only cleaner but use less energy. This makes good business sense.

Specific company activities include energy efficiency improvements, investment in cogeneration facilities, development of renewables, capture and sequestration of CO_2, research on fuel cell technology and advanced fuels, the reduction and elimination of venting and flaring and enhanced use of natural gas. We also concentrate on helping customers reduce their own emissions through increasing energy efficiency and the use of cleaner products.

● *Engagement and community outreach* *(see page 26)*

Oil and gas operations are increasingly becoming integral parts of the communities in which they are located. Our industry is accomplishing this integration—at local, regional and national levels—through carefully planned programmes for infrastructure investment, employment, education and communication.

Moreover, these programmes are themselves the result of extensive consultation. This is part of an ongoing process that involves not only governments, banks and NGOs, but also, and most important of all, the people of the communities in which our operations have an impact.

● *Ethics and human rights* *(see page 31)*

Few, if any, companies in our industry would have trouble supporting the universal values of truth, compassion, responsibility, freedom and reverence for life.

The oil and gas industry aims to apply these universal values in its day-to-day business. Such good intentions, however, are worthless unless they are coupled with effective practices and rigorous self-discipline in the areas of anti-corruption, ethical trading policies, equitable treatment for all and respect for indigenous, local communities and the environment.

● *Health management* *(see page 35)*

The impact of our operations and products on the health of employees, local communities and consumers—is a core element of sustainable development as far as our industry is concerned.

A primary aim is to protect people at every stage of operation through risk evaluation, rigorous procedures, training and close supervision of the working environment. In our communities we work to improve health systems by enhancing local capabilities or setting up our own medical units—which often benefit local people as well as our employees. Since many of our activities occur in areas where malaria and HIV/AIDS are rife, the industry's strategic health management often encompasses work to combat these diseases.

● *Oil spill prevention and response* *(see page 38)*

Oil spills can have a considerable impact on natural ecosystems, can harm wildlife, threaten amenities and disrupt people's livelihoods. They also, quite rightly, make banner headlines.

Though the media's attention eventually waivers, ours does not. The oil and shipping industry devotes enormous efforts to prevent spills and, if they still occur, to minimize any damage caused. We do this as individual companies, collectively, and in partnership with other organizations such as the International Maritime Organization. These efforts at prevention and mitigation are succeeding, with the number of major offshore spills down by half in the past 10 years.

● *Product stewardship* *(see page 44)*

Product stewardship encompasses an entire management process ensuring that health, safety and environmental protection are integral to the design, manufacture, marketing, distribution, use, recycling and disposal of products and associated wastes. This concept recognizes that producers and manufacturers have a responsibility to reduce the environmental footprint of their operations along with that of their products, leading to improved resource conservation and a sustainable economy. This requires cooperation at every phase of the product's life to achieve workable and cost-effective solutions.

● *Safety* *(see page 48)*

Oil and gas are potentially hazardous substances, produced, refined and transported in environments that can have their own unique dangers. Awareness of these facts drives our efforts to eliminate accidents.

Though there is still room for improvement, progress in some areas is encouraging. In upstream operations, for example, the frequency rate of lost time injuries halved between 1992 and 2000. Other statistics give rise for concern. The rate of fatalities has not seen a similar decline. This has led to a re-examination of safety efforts, giving new emphasis to human behavioural factors and their impact on safety.

● *Technology cooperation and capacity building* *(see page 52)*

Efficient technologies and management systems are the building blocks of sustainable development. They can provide a solid foundation for building a nation's capacity to eliminate poverty, improve living standards and protect the environment.

Since in many countries our industry is the economy's leading investor, we play a key role in technology cooperation and capacity building. Often this means helping to meet such basic needs as infrastructure, health, education, training, job creation and water supply. Whatever the activity, however, it is essential that the needs of host countries—and communities—be understood and respected. Increasingly, this process involves a 'learning phase' that leads to the use of existing national or local capabilities whenever possible.

● *Urban air quality* *(see page 58)*

In many parts of the world, there have been enormous improvements in the air we breathe. This is due to a number of developments. In transport, today's most advanced

vehicles are 98 per cent less polluting than new vehicles were 30 years ago. Energy efficiency has also played an important role—particularly in our own industry. In refining, for example, recent figures show an eight per cent improvement worldwide since 1992, with even more dramatic improvements forecast for the decade ahead.

Unfortunately, the news is not all good. In other countries deteriorating air quality in rapidly growing urban centres continues to be a challenge, made worse by congestion and infrastructure limitations. For our part, we are working to meet this challenge with new fuels and new sources of power, as well as the promotion of responsible standards—for phasing out leaded gasoline, for example—that currently benefit the developed world.

● *Waste management* *(see page 64)*

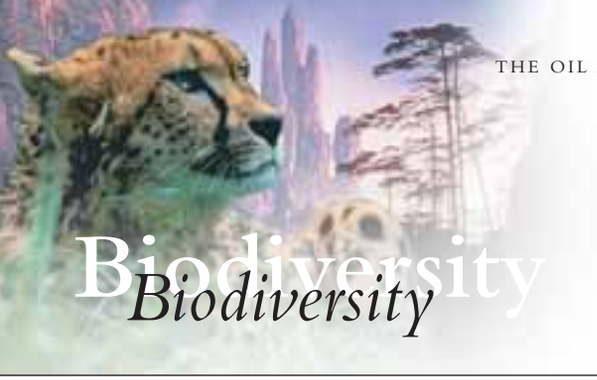
Health, safety and environmental protection are integral to the design, manufacture, marketing, distribution, use, recycling and disposal of petroleum industry products and their associated wastes. Key to this concept is the responsibility our industry bears in reducing the environmental footprint of our operations. This leads to improved resource conservation and sustainability. It relies on cooperation at every phase of product life to achieve workable and cost-effective solutions.

● *Water management* *(see page 68)*

Oil and water do mix. In fact, water is essential to many of our producing and refining processes. In areas where there are chronic shortages of water—and growing demand for our products—these imperatives must be balanced.

One way we do this is by restricting our use of potable water. Another is by treating and cleaning any water we use, making it safe for a variety of purposes. Yet another is by using our exploration and drilling skills to find new water sources to meet a variety of needs.

The following pages set out the background for each issue, examine industry responses in general and illustrate specific actions through selected case studies.



Biodiversity

Background

As the human race multiplies and expands its habitat, other species become more vulnerable. The result: a loss of biological diversity.

Justifiable concern over this issue has led to a series of international agreements on the protection of biodiversity. The United Nations Convention on Biological Diversity (CBD), which came into force in December 1993, is supported by 181 countries.

This is an issue of particular relevance to the oil and gas industry. We have been operating in some of the world's most sensitive environments for more than 100 years. These range from deserts, mangroves, wetlands, coral reefs, tropical rainforests and frozen tundra to heavily populated urban areas.

During that time, our record has not been perfect. Our efforts to improve have intensified in recent years, reflecting heightened awareness of our impact and its role in the environment.

In those sensitive environments in which we operate, we do so in full recognition of the potential environmental, economic and social consequences of biodiversity loss. Our operations on land, in coastal areas and the marine environment are designed to coexist with habitats important to a variety of biological species. Oil and gas activities are subject to internal as well as external controls designed to decrease the footprint of our operations and limit their impact.

Industry response

In the past 10 years, the oil and gas industry has put in place a wide variety of programmes to protect wildlife, rehabilitate and enhance habitats, support environmental education, fund continuous wildlife and vegetation surveys and conserve native species. These projects involve close cooperation with local, regional and national wildlife authorities and other key interested parties to ensure proper planning and execution of environmental protection measures. In addition to such consultation, they also benefit from other best practices in every phase of operation. These include environmental protection guidelines; environmental and social impact assessment; prevention, mitigation and control; monitoring; decommissioning; contribution to science and technology cooperation and capacity building.

Cooperation and consultation extend to indigenous populations, for whom biodiversity is often a cornerstone of existence. By protecting and maintaining natural resources for the social and economic benefit of these peoples, we are also safeguarding economic and business opportunities for generations to come.

Big as we are, the oil and gas industry cannot manage biodiversity issues alone. Increasingly, companies are forming partnerships to improve our effectiveness in

this area. For example, BP, ChevronTexaco, Shell and Statoil are working together with Conservation International, Fauna and Flora International, the World Conservation Union (IUCN), the Smithsonian Institution and the Nature Conservancy on the Energy and Biodiversity Initiative (EBI). The aim is to encourage integration of biodiversity conservation into oil and gas development and transmission through the business case for action, measuring biodiversity impacts, identifying minimum impact operational techniques and recommending criteria for site selection.

Operating in sensitive environments …

IPIECA and OGP have together produced a case study publication to demonstrate best ways to achieve minimum impact operations in a diverse range of environmental—and social—settings. Titled *The Oil Industry: Operating in Sensitive Environments*, the aim of this report is to encourage good practices, high standards and continuous improvement, as well as to provide a basis for discussion with groups outside the oil and gas industry.

Actions speaking louder than words

Case studies on biodiversity

Telling the trees from the forest

Threats to biodiversity are not a new phenomenon. In Scotland, for example, what is regarded as rugged natural scenery is largely man made; the result of centuries of human activity. BP, which has been investing in Scotland for 80 years, is now working with the Scottish Forest Alliance (SFA) to put the clock back by helping to re-establish the ancient Caledonian Forest.

SFA is an unusual public/private/voluntary sector collaboration backed by $14 million of funding from BP over the decade ahead. Initially, the project will tackle the reforestation of more than 20,000 acres with a stunning mix of native wood species including ash and alder on the shores of Lowland lochs, Atlantic oak along the west coast, classic Scots pine in the Highlands and birch scrub beyond the tree line towards the summits of hills and mountains.

Just as important as the trees to be planted is the wildlife they support; mosses and lichens cling to the trunks, while ferns and heathers will share the new forest floor with bluebells and other wild flowers. The elusive Scottish wildcat will be given an expanded habitat in sparse, high altitude forests, while pine marten and the endangered red squirrel will be able to colonize the trees that hug the lower slopes. Red deer, natural forest dwellers, and rare birds such as the crossbill and capercaillie will also be given a new chance to re-establish themselves.

People will benefit as well. Carefully managed and promoted, these woods can provide income from tourists as well as the raw materials for locally produced, sustainable products—everything from furniture to biomass fuel for small-scale renewable energy plants.

Working with the SFA, BP's objective is to leave a lasting legacy of biodiversity in Scotland for future generations.

Photograph by Niall Benvie

An ancient forest plays host to youth

Biodiversity

Rainforest restoration

Potential sites for exploratory drilling do not come much more sensitive than a primary rainforest in a national park that is also an important centre of ecotourism. TotalFinaElf took on these challenges in early 1995 when, in partnership with the Bolivian national oil company, YPFB, they began a project in the Tuichi Valley, a zone of high biodiversity in the Madidi National Park.

Recognizing the challenges from the outset, TotalFinaElf began the project with detailed studies, including a painstaking environmental impact assessment and an environmental baseline study using Landsat imagery validated by 'ground-truthing.' The company sought advice from a wide range of local, regional, national and global experts.

Only after months of detailed study and preparation did work actually begin. This was in line with the project-specific environmental management plan that included a strict waste management system, an environmental monitoring and auditing programme and an oil spill contingency plan.

Wherever possible, local people—with their expert knowledge of the forest—provided the labour for the project. This involved site clearance (a minimal 4 hectares for a 2.1 hectare working area), development and restoration using the original soil and plants.

Part of TotalFinaElf's Yariapo well site in the Tuichi Valley, Bolivia: approximately 17,000 trees were re-planted following completion of operations, and a three-year follow-up programme was established to ensure the success of the reforestation process.

Extensive use of helicopters avoided the need for construction of an access road. Geotextile-reinforced embankments and the planting of indigenous rapid-growth ground cover prevented soil erosion, while natural hydrological flows were preserved through the construction of rainwater channels to rivers.

Five years after completion of the restoration programme, the site is virtually indistinguishable from the surrounding acreage.

Drilling operations themselves made use of non-toxic water-based muds, and the dehydrating of cuttings was carried out using a high-powered shale shaker stored in a covered pit. On completion the area was fertilized and buried. Most solid wastes and used engine oil were heli-evacuated to an offsite logistic base for treatment or recycling.

Restoration of the site included returning the natural topography and hydrological networks to their original form, before reapplying the original topsoil enriched with locally-produced mulch. A reforestation programme involved the planting of 17,000 trees with 10,000 seedlings in reserve. A three-year follow-up programme ensured the successful restoration.

More than five years later, the site is virtually indistinguishable from neighbouring acreage, the only lasting legacy of TotalFinaElf's presence being a new classroom for the local school, medical equipment for the local hospital and the benefits of a health care programme aimed at combating leishmaniasis, a devastating regional disease.

A foundation for sustainability

When, in 1993, ChevronTexaco proposed to develop oil in Papua New Guinea's rain forest, many environmental NGOs had vociferous objections.

A year later, the local ChevronTexaco affiliate and its joint venture partners formed an alliance with one of these NGOs, the World Wildlife Fund (WWF) to create the Kikori Integrated Conservation and Development Project (KICDP). KICDP's objective was to protect the

Biodiversity

Kikori catchment, home to some of the planet's rarest wildlife. Many species—including the world's only underground roosting bird and 12 kinds of fish in Lake Kutubu—are found nowhere else. Other creatures unique to Kikori are the world's longest lizard, the largest pigeon, the biggest moth and the second-largest butterfly.

While, for its part, ChevronTexaco worked with the government, local landowners and joint venture participants to bury project pipelines, reinject produced water, minimize road construction and eliminate spills, KICDP focused on four specific areas:

- Conducting 12 major biodiversity surveys;
- Raising community awareness about the negative impacts of industrial-scale logging;
- Helping local residents develop a sustainable fishing strategy; and
- Establishing environmentally friendly, home-grown businesses.

One of the project's prime objectives was to protect the Kikori catchment, home to some of the planet's rarest wildlife including 12 species of fish found only in Lake Kutubu.

Seven years later, KICDP represents the most significant attempt at collaborative biodiversity protection ever undertaken by the oil and gas industry and an environmental organization. The World Bank called the project 'a model for other resource developers operating in ecologically sensitive environments'. And when Pulitzer Prizewinning environmentalist Jared Diamond visited the area expecting to see environmental devastation resulting from oil and gas activities, he found that 'Papua New Guinea's most endangered bird and mammal species' were 'much more abundant here than outside the area leased by ChevronTexaco.' Dr Diamond has been quoted in the media as saying that the company's oil fields are the 'best national park in New Guinea' and 'probably the best protected national park between the Himalayas and California'.

Building on that success, the local ChevronTexaco affiliate and the World Wildlife Fund have formed a unique NGO to continue protecting the environment of Papua New Guinea for generations to come. Called the Community Development Initiative (CDI) Foundation, the NGO has its own staff and facilities and has assumed responsibility for the affiliate's existing health, education, agriculture, skills development and cultural programmes. CDI integrates WWF's efforts to protect natural resources and supplements their community outreach components. New initiatives strengthen local development agencies and bolster conservation.

Drawing on WWF's examples of community sustainability, CDI replaces traditional company models for community assistance with a separate non-profit entity that develops increasing independence from the company. This new NGO is designed to have a life beyond the eventual closure of the petroleum project that brought it into being and will mitigate the impact of that eventual closure on communities that have become dependent on project benefits.

Putting biodiversity on the map

IPIECA is supporting the development of the Interactive Map Service (IMapS) through a partnership with the UNEP World Conservation Monitoring Centre.

IMapS is an on-line geographic information system allowing users to access biodiversity data and information on protected areas via the internet. Visitors to the site (www.unep-wcmc.org) can focus on selected regions and create their own maps featuring a choice of biodiversity and social information.

Access is available 24 hours a day, 365 days a year, providing a valuable tool for oil spill contingency planning, land-use planning and the preparation of environmental impact assessments. IPIECA sponsorship of IMapS has allowed coverage of the Mediterranean and Black Sea regions and is in the process of expanding to encompass new areas.

IMapS provides 24-hour access to biodiversity data and information on protected areas via the internet.

Biodiversity

Treading cautiously at Kharyaga

When it comes to biodiversity, the Siberian tundra is just as important—and as vulnerable—as temperate and tropical regions. That is why TotalFinaElf is exerting such care in its development of the Kharyaginskoie oil field in the Nenets Republic.

There, despite the permafrost (which undergoes a superficial melt during the summer), a number of species thrive in the tundra bogs and swamps, meadows, and spruce and birch forests. During extensive environmental impact assessments, TotalFinaElf identified more than 130 floral species on the site, including lichens highly sensitive to air pollution. The assessment also discovered that previous oil operations had already affected the site, leaving technogenic damage and soil pollution. TotalFinaElf was determined not to leave a similar legacy.

To protect the area, the permafrost was shielded by an additional layer of compacted backfill earth on an existing pad. This was done before any process installation work. All pits and processing areas were equipped with impermeable liners and slabs to safeguard groundwater. And by confining themselves to existing roads and access routes, TotalFinaElf avoided damage to vegetation.

Not only are ambient levels of atmospheric discharge well within Russian air standards, TotalFinaElf is also implementing a full monitoring programme. In addition to air measurement, this programme is determining subsurface and groundwater quality as well as snow condition. Regular surveillance of soils, flora and fauna are verifying compliance as well as detecting any potentially detrimental trends before they can do any damage to the environment.

Gulf mangroves regained

There was a time when the shores of the Arabian Gulf were green with mangroves. Thanks to the efforts of Saudi Aramco, these flowering trees, comparable to coral reefs and tropical rain forests in the fecundity of the habitats they foster, are once again taking root along the Kingdom's barren shores.

The decline of the Gulf mangrove is attributed to the actions of local tribes, who cut down the trees for wood, as well as more recent coastal developments involving dredging and landfill. Determined to stop this depredation, Saudi Aramco, in conjunction with the Research Institute of the King Fahd University of Petroleum and Minerals, began monitoring mangroves as early as the 1980s. Landfill was used only as a last resort and all coastal fills were done with clean sand. Wherever possible, mangrove sites were avoided entirely. Otherwise, the company implemented mitigation measures to protect the trees.

Five years after planting, adjacent to one of Saudi Aramco's major refineries, these mangrove stands are now thriving and reproducing.

The next step was to investigate the feasibility of transplanting young seedlings to re-establish former mangrove stands. Efforts were particularly successful in Abu Ali Bay, where an initial introduction of 100 seedlings has expanded into a swamp of thousands of young trees within five years.

In 1995, Saudi Aramco brought its mangrove project closer to home. In partnership with the

Biodiversity

National Commission for Wildlife Conservation and Development, the company began to raise young seedlings on the bay side beach adjacent to one of its major refineries. Five years later, these stands of mangrove are thriving and reproducing.

More recently, Saudi Aramco transplanted another 1000 seedlings to the site with the help of 50 local schoolboys, thereby raising environmental awareness among the next generation. Looking ahead a year or so, a new *in-situ* nursery with 10,000 potential seedlings will provide ample replanting opportunities to selected locations along the Kingdom's coast.

To protect and preserve these seedlings as well as established swamps, Saudi Aramco is an active member in the recently established National Committee for the Protection of Mangroves in the Arabian Gulf.

Keeping Villano verdant

The rainforests of Ecuador are home to about 10 per cent of the world's plant and animal species, including 120 species of mammals, 500 of fish, 600 of birds and at least 12,000 plants.

They are also the site of huge oil and gas reserves, including the 200 million barrels of the BP Villano discovery. To develop this highly sensitive site with minimum temporary disruption and no lasting damage, BP turned to a development model it had used successfully in the equally sensitive, but very different, environment of Alaska's North Slope.

Keeping to the smallest possible footprint for operations (a drillsite of just 9 acres), BP's main dilemma was with the oil pipeline. The challenge was how to lay the line in a roadless area without using heavy equipment and with minimal impact on the rainforest ecosystem. Adding to the complications was a decision not to bury the pipeline, since excavation could have damaged mature tree roots and caused erosion.

BP achieved the smallest possible footprint for their operations at Villano—just nine acres were cleared for the wellsite.

Rather than build roads, which would have been highly destructive, BP made use of a specially-adapted 'kaisser tractor'. This vehicle can perform a variety of tasks within a much narrower right of way than normally considered essential for pipeline installation. To minimize impact even further, a monorail system—adapted from those developed in Europe for transporting harvest loads in vineyards and orchards—was built to carry pipe sections to the welding front.

Thanks to these efforts, the pipeline had a much narrower right of way, avoiding larger trees and retaining long-term forest canopy cover.

Climate change

Background

The United Nations Framework Convention on Climate Change (UN FCCC), ratified by more than 180 nations, came into force in 1994. It contains a series of provisions, with the long-term goal to achieve 'stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'. The proposed first step towards this goal is a set of national emission reduction targets and timetables for developed countries, embodied in the Kyoto Protocol. Current scientific understanding, as detailed in the Third Assessment Report (TAR), produced by the Intergovernmental Panel on Climate Change (IPCC), gives evidence that climate change is taking place but also highlights the major uncertainties that remain.

Concern about climate change and the challenges and risks it poses will require sustained efforts to develop understanding and effective solutions while at the same time meeting the growing needs of society for energy. There is a belief that addressing these risks requires appropriate actions now, with due consideration for the significant scientific uncertainty that limits our ability today to predict exact future consequences. Our work convinces us that near-term action alone cannot address the long-term, global challenges and risks of climate change.

Industry response

Oil and gas companies are taking steps today to limit greenhouse gas emissions from operations and to improve customers' ability to use our products more efficiently now and in the future. Company policies and actions are implemented through operational management systems, investments, and research and development.

While actions differ from company to company, they include steps such as:

- efficiency improvements from operations and investment in cogeneration facilities;
- research and development to commercialize innovative technologies such as fuel cells, advanced fuels and separation and sequestration of CO_2;
- achieving greenhouse gas (GHG) reduction targets from operations by utilizing gas and reducing venting and flaring wherever possible;
- participation in commercial ventures on renewable energy; and

Sharing resources throughout the industry

IPIECA has organized workshops and symposia for industry, policy makers, academia and intergovernmental organizations. Recent events include a symposium on 'Long-term Carbon and Energy Management: Issues and Approaches' (2001) and a workshop on 'Opportunities, Issues and Barriers to the Kyoto Mechanisms' (2000). IPIECA also publishes reports addressing key scientific, technical and socio-economic aspects of climate change.

OGP has been active in identifying and sharing best practices on greenhouse gas (GHG) emissions, reductions and methodologies. Further work is under way to evaluate possible improvements to methodologies for estimating GHG from oil and gas operations.

The American Petroleum Institute's new *Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry, April 2001*, documents numerous calculation techniques and emission factors available for developing greenhouse gas emissions inventories for carbon dioxide and methane. The estimation techniques cover the full range of oil and gas industry operations—from exploration and production through refining to product marketing—including emissions from transportation of crude oil, natural gas and petroleum products.

American Petroleum Institute

- participation in emissions trading schemes and the establishment of internal trading schemes to seek cost-effective reductions across diverse operations.

The oil and gas industry is also contributing to the debate by improving scientific understanding of climate change and its impacts and by addressing well-known uncertainties and supporting research.

Clearly, climate change is an issue for which energy and environmental policy must go hand-in-hand. That is why our industry is increasingly working in partnership with other industries, national governments and international bodies in both developed and developing nations. These efforts include:

- encouraging the development of currently non-commercial technologies, developing cleaner fuels and fuel cell technologies and promoting the dissemination and use of efficient commercial technology;
- improving scientific understanding of climate change and its impacts by addressing well-known uncertainties and supporting policy research;
- assessing and implementing approaches to reduce the level of GHG production;
- supporting research and projects to capture and sequester CO_2 emissions from operations and to store carbon in forests and soils;
- participating in voluntary market-based initiatives and agreements such as emissions trading, Joint Implementation (JI) and Clean Development Mechanism (CDM);
- reducing GHG emissions through more efficient use of energy; and
- continuing participation in, and support for, the climate change debate to encourage development of appropriate options and strategies.

Through these steps the oil and gas industry fully intends to be a source of solutions for the challenges and concerns about climate change.

Greenhouse gas emissions—AIP/government plan of action

The Australian Institute of Petroleum (AIP) has drawn up a voluntary Facilitative Agreement with the government to establish a plan of action by AIP and participating companies. The aim is to reduce greenhouse gas emissions within the 'no regrets' framework of the National Greenhouse Response Strategy. AIP has agreed to promote cooperative action among member companies and review methodologies to ensure industry returns are accurate, comprehensive and useful.

Australian Institute of Petroleum

IPIECA Symposium: Long-term Carbon and Energy Management

Sustained efforts will be required to address concerns about climate change while at the same time meeting the growing needs of society for energy. To advance understanding of actions and policy frameworks that can contribute to long-term carbon and energy management, IPIECA convened an international symposium in October 2001.

The symposium brought together one hundred experts from academia, business, and government to share views on climate change science, long-term energy supply and demand, prospects for technological developments and policy framework options. A comprehensive list of 33 leading specialists gave presentations and papers on:

- science and scenarios of human induced climate change;
- long-term energy needs and carbon management;
- prospects for technology to address climate change; and
- policy frameworks to address long-term climate change.

A CD containing the speaker's papers and presentations, and an accompanying summary

Climate change

booklet, are available on request from IPIECA or can be downloaded from www.ipieca.org. The symposium, and these products, are part of an ongoing effort by IPIECA to provide constructive input to climate change understanding.

API-industry 'Best Practices' conferences

In December 1999, the American Petroleum Institute initiated the first in a series of conferences entitled: Voluntary Actions by the Oil and Gas Industry: A Conference on Industry Best Practices to Improve Energy Efficiency and to Reduce Greenhouse Gas Emissions. It included presentations from industry, academia, and government agencies on a broad range of voluntary activities currently under way in the oil and gas industry that directly or indirectly reduce carbon dioxide and methane emissions. These activities include:

- efforts to better understand the sources and quantities of GHG emissions generated by oil and gas industry operations;
- initiatives to reduce GHG emissions, including operational efficiencies and sequestration of carbon emissions;
- support for fundamental climate change research;
- research and development programmes on more energy efficient automotive systems; and
- development of renewable or alternative energy resources.

A second conference on voluntary actions is being planned for later in 2002.

Actions speaking louder than words

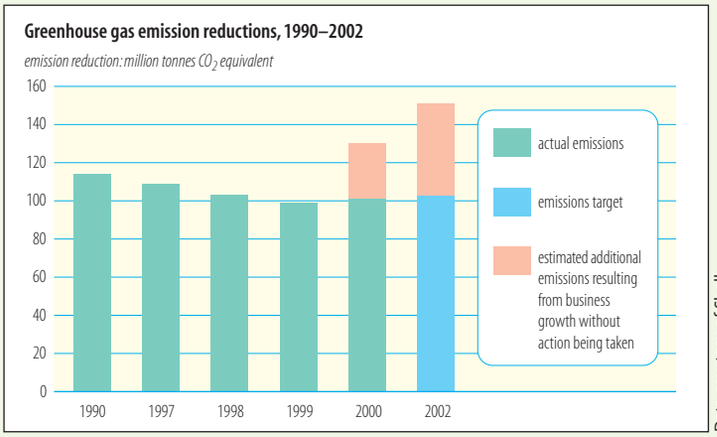
Case studies on climate change

Taking STEPS on emissions trading

Shell's greenhouse gas emission strategy is best understood in the context of fundamental changes in the company's approach to its worldwide operations, which took place in the mid 1990s. The company has now adopted the following:

- the view that sustainable development encompasses financial, social and environmental aspects, and is an integral part of all business decisions; and
- a revision in business principles towards openness and transparency. This included a decision in 1997 to monitor and report 24 key health, safety and environment parameters, and to have 12 of these verified by an independent agency.

For GHG emissions, Shell has set an absolute emission reduction target of 10 per cent below 1990 emission levels by 2002. The company has also developed a pilot internal emissions trading system, the



Data courtesy of Shell

Shell Tradable Emission Permit System (STEPS) and has developed a CDM demonstration programme.

In 2000, Shell's GHG emissions increased slightly, mainly as a result of higher production. GHG emissions are now 11 per cent below 1990 levels in line with the reduction target. Shell is achieving its emission reductions primarily through the reduction of venting and flaring of natural gas associated with oil production, and energy efficiency in refineries and chemical plants. Disposal of gas by continuous venting will be phased out by 2003, while continuous flaring will cease by 2008.

Filling the gaps

Storage of CO_2 in underground geological formations has the potential of avoiding emission of huge quantities of CO_2 from fossil fuels to the atmosphere, and thus possibly reducing adverse climatic effects. Beginning in late 1996, l million tons of CO_2 per year have been stored at the Statoil operated Sleipner field in the North Sea.

The capacity to store CO_2 underground within Europe is probably more than 800 billion tons of CO_2, particularly in the huge sedimentary basin under the North Sea. This is the first case of industrial scale CO_2 storage in the world. It is being injected into the 'Utsira' formation—thick saltwater-bearing sandstone at a depth of approximately 1000 metres under the seabed. In addition to demonstrating the long-term feasibility of storing CO_2 in the Sleipner field, the project will also provide solid scientific documentation so that the approach may be applied in other geographical areas and by other industries.

The programme is being undertaken with support from petroleum and energy companies, and European ministries and research councils. Intercontinental cooperation, with similar projects in Canada, USA and Australia, is being coordinated through the International Energy Agency (IEA) Greenhouse Gas R&D Programme. Statoil is also participating in the joint industry CO_2 Capture Project (www.co2capture-project.com), with BP, Shell, ENI, ChevronTexaco and other energy companies to develop new technologies to reduce the cost of CO_2 separation, capture and geologic storage from various combustion sources.

An artist's impression of the CO_2 injection well at the Statoil-operated Sleipner field

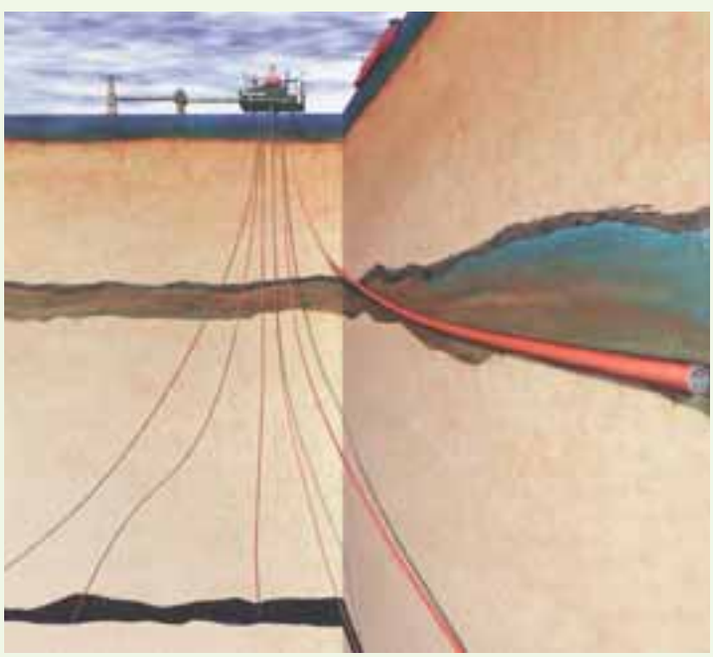


Illustration by David Fierstein

Size no obstacle

Nexen Inc. is a relatively small Canadian-based exploration and production company with operations in eight countries. Domestically, Nexen has been actively engaged in reducing emissions associated with production operations since the mid 1990s. Nexen was one of the original group of companies to register in the Voluntary Challenge and Registry (VCR) through an agreement between the upstream oil and gas industry and the Canadian government. A 1990 baseline has been recreated, emissions measured/estimated and reported and plans developed to reduce emissions over the next few years.

While energy efficiency has been the longer-term focus, reductions in GHG have been achieved through

Nexen is reducing trucking of heavy oil by installing flow lines (below) from the well head directly to the processing facilities.

Climate change

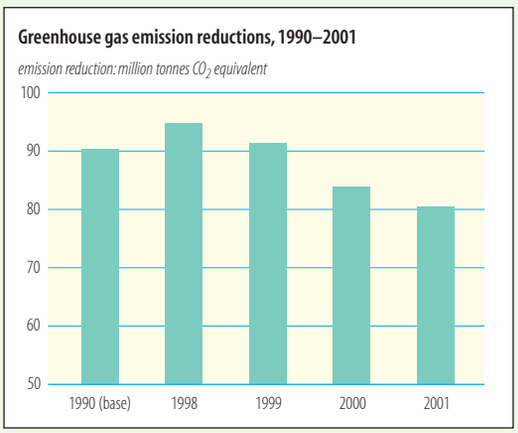
This compressor is used in Nexen's heavy oil operations in Canada to capture previously flared or vented methane. Installation of these units has reduced Nexen's greenhouse gas emissions by upwards of 1 million tonnes of CO_2 equivalent per year.

collection of wellhead casing and tank vent methane emissions that were previously released directly to the atmosphere or flared. The gas that is collected is tied to the sales gas system, further enhancing the attractiveness of reducing these emissions. Nexen supports a number of research and development projects that are focused on understanding the technical issues and capacity in the Western Canada Sedimentary Basin associated with geological sequestration of CO_2.

Internationally, Nexen has been active in evaluating CDM investments related to production and exploration activities in Yemen, Nigeria and Colombia, three of the company's core countries. Nexen has looked beyond the oil and gas sector, evaluated many investments and became a partner in the Belize Rio Bravo carbon sequestration project coordinated by The Nature Conservancy.

Going to market internally

BP launched the first ever global corporate GHG emissions trading system in January 2000. This tool was implemented to assist delivery of the company's GHG reduction commitments cost-effectively. Each of the company's business units has been given yearly emission allocation caps and must meet them by abatement of their emissions through project implementation, or by trading through the intranet-based trading system.



BP's greenhouse gas emissions trading system supported its commitment towards reducing emissions which have been falling steadily since 1998.

The second yearly compliance period has passed and more than seven million tonnes of carbon dioxide equivalent have been traded since start-up. The trading system has provided a robust framework for the business units within the company to manage and reduce their emissions, and has enabled the business to incorporate the financial impacts of GHG emissions into project planning processes. Employees have been given the challenge to look for innovative ways to reduce GHG emissions in their operations, and this approach has already identified unexpected economic opportunities.

BP's internal experience will now underpin its participation in external emissions trading systems. Work is focused on the development of credit based trading mechanisms to complement the existing GHG reduction tools.

Improving efficiency through cogeneration

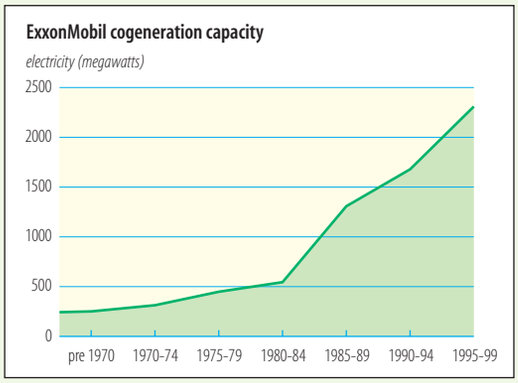
Among the more promising approaches to addressing the risks of climate change are those that rely upon economically attractive actions and advanced technology. One good example is the increasing use of cogeneration units at major industrial facilities such as petroleum refineries and chemical plants.

This means that a fuel, usually natural gas, is used directly in a large power turbine that generates elec-

Climate change

tricity for running the plant. The hot gases emitted from the turbine can then be used to produce hot water and steam, required to transform raw materials into consumer products, without consuming other fuel for that purpose. The overall efficiency of this process can be twice as high as older approaches, where oil and gas were burnt to generate steam, and electricity was bought from outside companies. Cogeneration units make economic sense, save energy and reduce carbon emissions.

ExxonMobil is a leader in the installation of cogeneration, with the ability to generate the equivalent of 2300 megawatts of electricity. Cogeneration now meets about 70 per cent of ExxonMobil's refining and chemical plant needs. Capacity in place has reduced carbon dioxide emissions by almost 6 million tonnes a year from what they would otherwise have been. The energy saved is about one-fourth of that generated as electricity by all the wind and solar power facilities worldwide. Another 1000 megawatts of cogeneration is under development, making ExxonMobil's ultimate cogeneration potential even greater.



Cogeneration technology now provides almost 70 per cent of ExxonMobil's refinery and chemical plant needs, whilst reducing CO_2 emissions by almost 6 million tonnes a year.

Engagement and community outreach

Background

Oil and gas companies aim to be active and responsible members of the communities in which they operate. Community investment is one means of achieving this. Effective public consultation programmes are another. So are well-designed and proactive community affairs programmes that help to provide a responsible, safe and open operating environment. And in the longer term, investments in infrastructure, education and health provide the means for communities to help themselves.

These activities are in keeping with our industry's commitment to community involvement, extending to local, regional and national dimensions. According to Philanthropic Initiative, a leading NGO, such involvement should 'provide a measurable return to help meet business goals and corporate interests, as well as demonstrate a positive impact on critical and relevant community needs and social issues.' Community involvement implies community communication as well to engage people in the decision-making processes that affect them.

Industry response

In the past, the oil and gas industry has, at times erred in developing and implementing community outreach and assistance programmes. More recently, we have learned many lessons and are committed to improving consultation and outreach to help move the industry forward in a more sustainable fashion. Effective ongoing community dialogue is essential for creating and maintaining realistic expectations.

Creating genuine partnerships among diverse groups is a complex and often difficult process but one which offers many potential advantages. The oil industry recognizes that multi-stakeholder partnerships can:

- mobilize greater and more varied skills and resources than can be achieved by acting alone;
- address common problems in a more integrated, multi-disciplinary manner;
- minimize duplication of cost and effort;
- help traditional adversaries to respect each others' needs and capabilities;
- facilitate the dialogue and mutual trust needed to work through diverse and often conflicting interests, towards common goals; and
- promote the flow of information and technology cooperation.

An effective engagement process with stakeholders at large and communities often entails some form of consultation. The objectives of the consultation process are manifold:

I. to inform and educate interested parties in a process that extends to communities, governments, banks, NGOs and others.
II. to establish areas of cooperation, including:
    - identifying problems, concerns and needs;
    - learning through local knowledge;
    - promoting understanding and enhancing acceptability; and
    - evaluating alternatives and seeking solutions.
III. to avoid conflicts and resolve them to the extent practicable.

With the demand for greater openness in corporate behaviour, the success of our operations increasingly depends upon achieving better understanding of various perspectives and reaching consensus. This does not come overnight. When achieved, it is the product of listening skills followed by extended dialogue and consultation.

Engagement and community outreach

Such engagement and community outreach is integral to the oil and gas industry's environmental and social assessment process. It also makes good business sense. For existing operations, it can maintain good relations or improve those that may have deteriorated. For new projects, the sooner we know and understand community views, the better. This reduces the chance of later opposition, delays or costly modifications. Just as important, it opens up opportunities for potential partnerships, enhances project credibility and acceptability and gives early access to additional specialist expertise, competence and support, which in turn facilitate bringing sustainable benefits to the community.

The community always matters . . .

American Petroleum Institute

The American Petroleum Institute held an Industry Best Practices Conference on Exploration and Production Community Outreach in December 2000. This conference provided critical information on the best programmes and approaches for upstream oil and gas operations in order to effectively partner and interact with the communities in which they operate. An effective community outreach programme is essential to obtain and maintain a 'licence to operate' within these communities. The conference included numerous North American case studies, a perspective from programmes in developing countries, information on community expectations, resources available to develop these programmes, and a communication and partnering workshop. In addition, API released a new guidelines document on this subject entitled *Community Matters*, which is currently available from API.

Actions speaking louder than words

Case studies on engagement and community outreach

Philippines community consultations

In the past, it was the operator who determined the site of an offshore facility. At Shell's Malampaya deepwater gas to power project, the platform location and pipeline route were the subject of extensive consultations with local communities.

After considerable local input was factored into scientific assessments, the platform is now in place and has been operating since the end of 2001. It is in an area that is not fished commercially and has negligible coral growth. The offshore pipeline will be long enough to avoid environmental and earthquake risks. Equally important, its route takes account of local aquaculture, fishing grounds and sacred areas.

Other issues raised during the dialogue on development included concerns about the potential impacts of river transport on safety and fisheries and the ramifications of secondary development as a result of road construction. These, too, have been reflected in the project.

Getting to know the neighbours

Calgary, Canada's oil capital, has greatly expanded in recent years—so much so that parts of the city are now close to a major sour gas reservoir. When Nexen, which had been producing from this reservoir for 30 years, planned to expand operations to hasten field depletion, local residents were understandably concerned.

Despite Nexen's unblemished safety record in the area, the public was outraged over what they per-

Engagement and community outreach

Open house meetings are used as an effective method of communication with our community neighbours regarding sour gas development near urban areas.

ceived to be a new and risky intrusion in their lives. The company, confident in the scientific evidence that showed expanded operations to be safe, found it difficult to empathize with residents' concerns. And after all, Nexen had been there first.

The first step in getting around this impasse was to enlist the help of the province's energy regulator, Alberta Energy Resources Conservation Board (ERCB—now known as the Energy Utilities Board). ERCB recommended a voluntary public consultative mechanism outside of the formal regulatory process and under its own auspices but with the help of a neutral, third-party facilitator acceptable to both company and residents.

It was not a quick solution. Only after months of meetings did mutual respect and trust evolve. Then, both sides were able to consolidate the issues into four key and workable areas: public safety, orderly and economic development of the reserves, land-use conflicts, and communications.

Each of these issues was tackled by a sub-committee under the leadership of a member of the public. This involved detailed examination, seeking resolution for any outstanding areas of disagreement and then achieving consensus.

In the end, working together with Nexen, the local community endorsed development of the sour wells, but within specified time limits.

Perhaps more important than the outcome itself were the lessons learned by Nexen, which have since been incorporated into the company's policy framework:

- the public has a legitimate right to participate in the decision-making process for issues that affect them;
- public consultation adds value and contributes towards a stable operating environment;
- consultation is the preferred mechanism to resolve issues with the public.

It is the public that must decide what constitutes an acceptable level of risk to their lives. The company's role is to facilitate this decision.

Forging relationships in Egypt

Through the years, in both peace and war, BP has forged a strong relationship with the country through association with the Egyptian Petroleum Company (EGPC). BP has demonstrated how this relationship has created significant success for both parties and has stood the test of time as one of the international petroleum industry's most effective company-country partnerships.

Over the past 35 years of operating in Egypt, BP has become a major contributor to projects in education, community support, health and cultural affairs. It has provided funding totalling about $23 million for such projects, with the largest share going to education, including management training, environmental engineering, strategic planning and cross-cultural exchanges. As an example, early in 1998 BP donated 100 new state-of-the-art computers to the petroleum departments of Egyptian universities. The computers are being used to train new generations of petroleum engineers and other specialists to work in Egypt's oil and natural gas industry and in the wider international petroleum business.

BP also supports the Sinai Centre for Integrated Environmental Education, being completed near Sharm El Sheikh. It is designed to provide education on environmental and health protection and wildlife conservation techniques for more than 1000 students and teachers annually. The centre enhances an already successful environmental programme begun by the Cairo American College and will help bring this field-based, interdisciplinary programme to a wider audience of students and teachers, allowing them to study the impact of economic activity on the natural fabric of Sinai's coastal reefs, deserts and mountains.

In the cultural support area, BP has been a major contributor to the American University of Cairo's ongoing Theban mapping project to chart the topography and the contents of the whole area of the Royal Theban necropolis, the Valleys of the Kings and Queens, and the Tombs of the Nobles.

Turning alien vegetation into jobs in South Africa

Job creation is a prime objective in South Africa. With a formal unemployment rate of 35 per cent and the economy facing heightened competition after years of Apartheid-induced isolation, many previously employed people are now out of work.

In the Southern Cape, near the town of George, thousands of forestry workers have been made redundant in recent years. Government schemes to employ them in eradicating alien vegetation choking riverbeds and lowering the water table, have ameliorated the social consequences. But the money has run out and the Government can no longer afford the wages for this extremely labour intensive work.

Alien vegetation can become a source of sustainable paper.

The problem of invasive alien vegetation remains and the notorious Port Jackson wattle is a prime example. A mature specimen drinks 100 litres of water a day. Clearing up the proliferation of Port Jackson wattles, which have dried up rivers in an area already short of water, could take 20 years. The challenge is to create a sustainable economic operation to carry out the clearance.

The South Cape Business Centre came up with a multi-faceted approach that BP Southern Africa was happy to support financially. The scheme has created 120 sustainable jobs so far, and has encouraged and educated entrepreneurial talent in the community. It also has the potential to reverse the serious ecological damage wrought by alien vegetation.

Starting in April 1999, 12 teams each of ten men and women, assembled voluntarily. Some teams were collected together by a self-appointed leader while others elected their own team leader. Collectively, and with the assistance of a local micro-entrepreneur, each team contracted with local farmers to cut down and remove invasive Port Jackson trees.

Charcoal producers make use of the wattles' small branches.

First, the trees are cut down with a chainsaw, which each team purchases with a low interest loan from the Business Centre.

Next comes the bark stripping process. After the bark has been fed into a chipper to make mulch to be sold through garden centres, the rest is made into compost. Salvaged wood is used for making toys and rustic garden furniture.

Stripped of their bark, the logs (up to 2.5 metres in length and 50 centimetres in diameter) are loaded onto wagons and taken by rail to paper mills in South Africa's Natal province that contract to pay each team so much per tonne.

Meanwhile, on site, portable steel ovens convert smaller branches to charcoal, which is then bagged and sold to local retailers for barbecue fuel.

Charcoal and mulch are packed in paper bags screen-printed at a BP-financed refurbished building in the nearby village of Pacaltsdorp. The Business Centre provides help with bookkeeping skills, marketing techniques, tax problems and other skills required to run a small business.

The scheme is looking good. Contracts have been signed a year ahead. More farmers are queuing up for help in ridding their lands of alien plants and government-owned land has been made available by the Work for Water programme, a project run by the Department of Water Affairs.

In five years time the rivers might start running all year again—something they haven't done for more than a century.

Engagement and community outreach

Chad-Cameroon oil development and pipeline project

The Chad-Cameroon oil development and pipeline project, currently being undertaken by a consortium led by a subsidiary of ExxonMobil and supported by the World Bank, is developing oil fields in southern Chad and transporting the crude oil 1070 kilometres by pipeline to the Cameroon coast for export to world markets.

A portion of the pipeline, about 100 kilometres, traverses an area of coastal Cameroon where certain Bagyeli/Bakola reside in the vicinity of the narrow pipeline easement and a one hundred-year-old road in a corridor through the Atlantic Littoral Forest. The Bagyeli/Bakola (sometimes referred to as 'Pygmies') are an indigenous people as per World Bank criteria.

The project has established an environmental foundation to manage, among other programmes, an indigenous people's plan, which recognizes the unique circumstances and needs of those Bagyeli/Bakola affected by the project. The plan, developed in consultation with the Bagyeli/Bakola, will support programmes to provide long-term benefits to address health, education and agriculture priorities and has been funded by a $600,000 contribution to the environmental foundation.

The project provided books and supplies at schools serving more than 250 Pygmy children during 2001. Building supplies have also been provided to support renovation projects at two boarding schools that serve Bagyeli/Bakola students.

Farming implements such as hoes, shovels and machetes were distributed in more than 20 settlements as part of the project's 2001 agricultural and educational development programme for the Pygmies.

The pipeline will be buried along a route through Chad and Cameroon that was selected following the most extensive consultation process ever conducted in that part of the world. Tens of thousands of people have had the opportunity to express their views in more than 1100 public meetings. Local citizens, non-government organizations and the World Bank were consulted as part of the process. The World Bank agreed in June 2000 to support the project after a great deal of study, determining that the project will benefit the people of the two African nations without harming the environment or disrupting populations.

Ethics and human rights

Background

The Universal Declaration for Human Rights (UDHR) was developed more than 50 years ago. The far-reaching United States Foreign Corrupt Practices Act (FCPA) was enacted a generation ago.

Important as they are, these milestones have still not removed the barriers to investment that exist for many companies. Concerns over corruption, human rights and labour issues still inhibit a number of international corporations—including those in the oil and gas industry—from making foreign investments.

Arguments about cultural differences or lack of business sophistication in some developing nations cannot explain away these obstacles. In its Global Values Survey, which represented 40 countries and 50 different faith communities, the Institute for Global Ethics found the five most important values to be truth, compassion, responsibility, freedom and reverence for life.

Industry response

No matter where we operate, the oil and gas industry aims to apply these universal values by following ethical business practices; by combating corruption and enforcing ethical trading policies; by treating all people equitably through non-discriminatory employment practice and provision of a living wage; by respecting indigenous people and local communities and involving them in decisions that may effect them; and by working to ensure a fair sharing of economic benefits.

Some companies in our industry have taken a sense of direction in ethics and human rights from the Global Compact, an initiative of the United Nations Secretary General Kofi Annan. The Global Compact calls for a closer and mutually supportive partnership between the UN and the private sector and puts a more human face on globalization. It encourages good practices based on nine universal principles covering human rights, labour and the environment. Endorsing companies develop and implement community projects that demonstrate their best practices and support of the Global Compact principles. Many other companies that have not formally endorsed the Global Compact have nevertheless incorporated many of its principles within their own corporate policies and standards. Other companies have endorsed the Sullivan Principles, which also contain principles addressing a range of social responsibility issues.

Ethical trading is another relevant issue, centring as it does around commodity/raw goods in which market prices often undergo severe and rapid fluctuations. This has an impact on both employees and communities. Ethical trading draws on core International Labour Organization (ILO) conventions that include freedom of association, decent wages, adequate living conditions, worker representation, security and minimum health and safety standards.

In remote areas, the rights of indigenous peoples play an important part in our operations. Our commercial successes must be sustained in ways that demonstrate respect for the indigenous peoples who, after all, were there first. In the

A constructive approach to addressing corruption

An area of particular concern to our industry is the fight against corruption, as 80 per cent of the world's oil and gas reserves are in countries found at the bottom of Transparency International's Corruption Perceptions Index. To help in that fight OGP has set up an Anti-Corruption Task Force to explore issues and discuss case studies on topics that include education and training, standards and codes, due diligence, verification, joint work with other organizations, communications and advocacy.

OGP
International Association of Oil & Gas Producers

Ethics and human rights

broadest sense, this respect means acknowledging the right of these people to exist and maintain a separate identity if they so choose. When mutually beneficial partnerships are an option, our industry can play a major role in building capacity in communities and helping to strengthen the ability for good governance. Negotiating with licensing authorities to ensure that benefits are fairly distributed—or paying royalties directly to communities—helps to achieve these aims.

Issues of ethics and human rights also encompass our industry's fundamental risk management and employment practices. Again, these are primarily community-linked: sound community development programmes contribute to successful operations under even the most challenging conditions. Similarly, company diversity in employment should reflect community diversity in race/ethnicity and gender.

According to the US-based organization Business for Social Responsibility 'as companies are becoming more aware of the forms and impacts of discriminatory practices in the global workplace, the complexity and culturally-engrained nature of some of the practices mean that further education may be needed before companies can develop leadership practices designed to diminish the occurrence of discrimination in their or their partners' work facilities.' This points out the challenges of a global marketplace. Our companies' most difficult set of challenges is working within country-specific and site-specific environments while respecting competing societal factors, cultures and practices—and adhering to our fundamental values.

Actions speaking louder than words

Case studies on ethics and human rights

Applying business principles globally

Besides endorsing the Global Compact, the UDHR and other international human rights standards, Royal Dutch Shell wanted to operationalize their commitments. Consequently, in 1997 Shell became the first energy company to formally incorporate respect for human rights into its General Business Principles.

In 1996, at the time when it was being criticized about its activities in Nigeria, the company engaged in a series of global dialogues with stakeholders. Revisions to the Global Business Principles resulted, together with the strengthening of assurance processes, including an annual report from each Shell company chairman on how the Business Principles had been implemented

In 1997 Shell published the Shell Report called *People, Planet and Profits*, describing its performance against its business principles. The Shell Report has been published annually since then. Shell's website also solicits feedback on all of its business practices.

Although Shell recognizes that, as a company, there are limits to its legal or actual influence, Shell companies are able to express support for fundamental human rights within their sphere of operation. This support may not necessarily be in the form of a public statement. As a corporation, Shell seeks to uphold human rights standards in other ways as well, including: publishing primers on human rights for employees; assessing community impact; engaging in open and honest dialogue with NGOs; and participating in government initiatives—for example, the development of Voluntary Principles on Security and Human Rights with the US and UK governments, other companies, human rights groups and trade unions.

Ethics and human rights

Promoting labour harmony

Statoil's approach to labour relations is rooted in a Norwegian tradition that emphasizes dialogue and cooperation as the basis for relationships between employers and employees. This helps to engender a culture of trust within the company and encourages open channels of communication throughout the 21 countries in which Statoil operates.

Within this vast geographical spread there are, however, great variations in terms of socio-economic development and degrees of political freedom. Consequently, the extent to which labour rights are respected also varies, meaning that Statoil's challenges of upholding labour standards and developing good industrial relations differ from one country to another.

Nevertheless, the promotion of cooperation between workers and management remains a part of Statoil's basic approach to labour relations, helping to create a stable business environment and securing the company's 'licence to operate.' Statoil's agreement with the International Federation of Chemical, Energy, Mine and General Workers' Unions (ICEM) was a significant and practical reinforcement of this philosophy, providing a global agreement for local improvement. The purpose of the agreement was: 'To create an open channel of information between ICEM and Statoil management about industrial relations issues in order to continuously improve and develop good work practice in Statoil's worldwide operations.'

Signed in 1998, the Statoil/ICEM agreement was the first of its kind between a labour federation (whose members encompass 20 million workers in 110 countries) and an individual company. To create a natural link between Statoil and ICEM, the Norwegian Oil and Petrochemical Workers' Union (NOPEF) acted as intermediary and signed the agreement on their own behalf. It was renewed in March 2001 and adapted to the principles of the Global Compact.

At the signing of the ICEM Agreement, from left to right: Lars Anders Myhre (Norwegian Oil and Petrochemical Workers' Union); Jostein Gaasemyr (Statoil); and Fred Higgs (ICEM)

Community partnership in Yemen

Nexen's Yemenization programme is a partnership in which the government, community, stakeholders and the company can achieve mutual goals.

Central to the programme is an intensive, three-year English language and technical course that qualifies people for full-time employment in a number of fields. The numbers of Yemenis employed has increased at a steady pace—about nine per cent a year since Nexen began the programme in 1993, though no quota system is in operation. Instead, the programme was developed as an effective means to manage a sensitive issue.

Currently 65 per cent of Nexen's employees in Yemen are Yemeni. By 2009, the company hopes that figure will grow to 80 per cent.

A scholarship programme will help to achieve that aspiration as promising Yemeni students receive post-secondary education in Canada, Nexen's home country. Candidates are selected on their ability to succeed, combined with a commitment to bring the knowledge gained back to Yemen when their education is complete. The multi-tiered selection process is based primarily on objective criteria to ensure that the integrity of the process is maintained and only the most deserving students receive awards. In 2000 Nexen doubled its commitment to 40 scholarships.

Promoting human rights in Azerbaijan

Azerbaijan has one of the highest concentrations of refugees and internally displaced persons in the world—some 13.8 per cent of the population. There, a Statoil project, managed by the Norwegian Refugee Council, is working to contribute to peace building, reconciliation and democratization while promoting human rights through education.

Ethics and human rights

The project organizes the production and distribution of school support materials and provides training for primary and secondary school teachers. They, in turn, explain and raise awareness about human rights among their pupils. The project also includes introductory workshops and seminars for relevant government and private institutions—spreading the human rights message to the widest possible audiences.

In a wider context, Statoil has also supported the Organization for Security and Co-operation in Europe's (OSCE) Office for Democratic Institutions and Human Rights (ODIHR) in working with Azeri authorities to revise the nation's electoral law to bring it more in accordance with international standards for democracy, fairness and transparency. Statoil's involvement was part of the company's efforts to move beyond traditional philanthropy and contribute to projects with an institution-building character, aligning efforts to those of authorities, NGOs and multilateral organizations.

Abiding with ethical codes in Myanmar

In 1990, TotalFinaElf signed a contract in Thailand to operate the Bongkot field development project. The consortium that operates the field consists of TotalFinaElf, Unocal, PTT EP and Myanmar Oil and Gas Enterprise (MOGE). The project includes offshore installations and a 63-kilometre onshore pipeline in Myanmar, running from the coast to the Thai border.

All work related to the project was carried out under the operational control of TotalFinaElf, which engaged contractors with solid international reputations who agreed by contract to comply with the Group's Code of Conduct. TotalFinaElf's code of conduct explicitly refers to three internationally recognized documents—the Universal Declaration of Human Rights of 1948, the principles of the International Labour Organization and the OECD guidelines for multinationals—and indicates that TotalFinaElf abides by their standards. In addition, TotalFinaElf E&P Myanmar drafted a specific addendum to this code of conduct stating its commitment to protecting the environment, supporting the socio-economic development of local communities and ensuring that human rights are respected, in particular by forbidding forced labour. This addendum is displayed in English and Burmese in TotalFinaElf Yangon Office and at TotalFinaElf industrial facilities across the country.

Significant technical and human resources were required to build the onshore pipeline. By employing local workers wherever possible, the project partners provided substantial resources to people living near the pipeline. Since 1 January 1999, Myanmar nationals have held 85 per cent of operating positions. Among the benefits they receive are health care, access to low interest loans, pension plans and life and accident insurance.

A meeting of the village communication committee in Eindayaza

Local integration of the project was a priority. In 1995, an extensive $6 million programme of socio-economic measures was developed following broad-based discussions with the people living in the pipeline region. The programme covers four areas: health care, education; promotion of local economic development by empowering village residents; building of new local infrastructure. Initially limited to the area close to the pipeline, socioeconomic aid has now been extended to Yangon, with a major support programme for orphanages, and to the Mandalay region, where TotalFinaElf is funding a Helen Keller International programme to prevent blindness. The annual budget is currently around $1 million. TotalFinaElf Myanmar's Socioeconomic Department has 26 employees, including a coordination team handling daily relations with local residents as part of TotalFinaElf's ongoing commitment to continuous dialogue.

Constructive engagement accelerates a country's economic and social growth, whereas history seems to show that isolation curbs development and adversely impacts the local population. TotalFinaElf is currently looking for an independent and reliable organization willing to conduct a socio-economic audit of its operations in Myanmar, which will be made public.

Health management

Background

Health is a core element of sustainable development. Oil and gas companies and their contractors need to rely on employees who are healthy and fully functional in their jobs. These people will not be healthy if their families are unhealthy. Their families will not be healthy if they are living in unhealthy communities.

By working with communities to improve their health delivery capabilities through training, systems and equipment, our efforts usually create an infrastructure and culture that can succeed and prosper independently, long after the initial sponsorship.

Industry response

Work to improve health in the host countries where we do business is shared by individual oil and gas companies and industry associations. Areas of activity encompass the health of employees themselves, the communities in which they live, and stewardship over the health implications of what we produce and how it is distributed.

In terms of employee health, companies throughout the industry engage in extensive efforts to protect and promote employee well-being. In our operations we engage in risk evaluation, rigorous procedures, training and information programmes for personnel and contractors, and regular workplace inspections to control noise, dust and hazardous substances.

Where health systems are inadequate or, in many cases, non-existent, oil and gas companies set up their own medical units. Benefits of these medical centres are often made available to local communities. Often community medical care extends to help in building, staffing and providing hospitals, the promotion of health education, and provision of clean drinking water. In many cases, where diseases such as malaria and HIV/AIDS are rife, industry programmes have a specific as well as general focus. In addition to focusing on sustainable interventions, the industry is increasingly working with host governments to enhance philosophies and strategies for delivery of health care services and infrastructure.

HIV/AIDS is a major threat in many of the areas in which our industry operates, with implications for health, social welfare and the economies of host communities.

OGP has published guidelines to assist in the development and application of measures to control HIV/AIDS—as well as other blood-borne pathogens. Developed for the use of health professionals and management, it also serves as a reference document for industry people who want to determine the safeguards that are in place. These guidelines are applicable to everyone working in the upstream industry as well as their dependents.

Health, safety and environmental management systems

OGP has developed a number of guidance documents to help our industry increase across the board effectiveness in health management. These have included guidelines on general health issues as well as such specifics as: monitoring and measuring health as part of HSE management systems, standards for local medical support, health aspects of work in extreme climates, assessing fitness to work and health management in remote land-based geophysical operations.

International Association of Oil & Gas Producers

In 2000, OGP issued a report on *Strategic Health Management: Principles and Guidelines for the Oil and Gas Industry*. This document sets out a systematic process for incorporating community health into local project planning and management. It follows the OGP HSE management system model and emphasizes the need for cooperation between oil and gas companies, governments and civil society.

Health management

One way in which HIV is transmitted, particularly in Africa, is via transport routes along major arterial networks. The transport of fuel in certain regions—particularly Sub-Saharan Africa—inevitably makes a contribution to this pattern. As a first step in trying to remedy this situation, IPIECA is planning a guidance note, *Knowledge, Policy and Action*, to help members review existing transport practices and provide them with materials to launch an education campaign aimed particularly at tank truck drivers.

Human Health Initiative

IPIECA's Human Health Initiative was recently set up to help the industry identify health issues of global concern. It draws attention to impacts of the industry's products and operations on workers and the public, identifies research gaps and encourages industry cooperative efforts to address these gaps. The Initiative will also disseminate health research information and technical and educational material and tools.

Actions speaking louder than words

Case studies on health management

Combating HIV/AIDS

In an effort to promote HIV/AIDS prevention awareness, ChevronTexaco sponsored an on-line workshop for African women journalists. The five-day event, conducted by the African Women's Media Center, involved the simultaneous participation of 130 journalists in 12 African nations. ChevronTexaco's own office in Lekki served as one of the satellite sites for the workshop. Topics covered included the causes of HIV/AIDS in women in Africa, approaches to prevention and care, social and cultural beliefs that affect women and AIDS and the role of the media. For many of the participants, the session was doubly educational, marking their first exposure to the learning/communications potential of the Internet. For more information visit the Corporate Council on Africa (CCA) website: **www.africacncl.org/whatsnew/PR-May15_2000aids.htm**.

Meanwhile, BP has been a founding sponsor of 'Soul City', South Africa's innovative and widely popular example educational entertainment. A soap opera with a difference, 'Soul City' tackles some of South Africa's most pressing issues, with AIDS awareness foremost among the recent story lines.

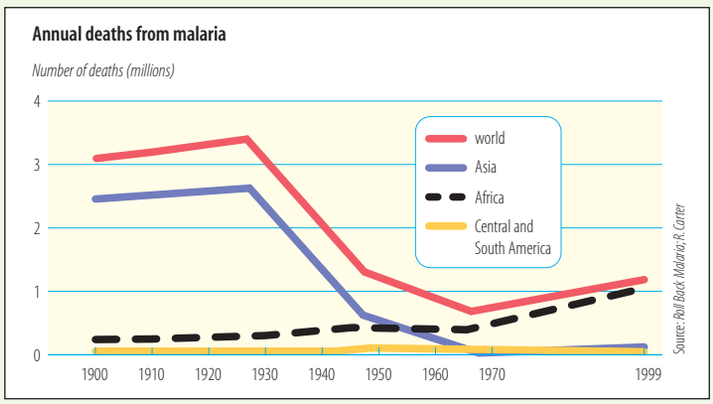
An on-line workshop for women journalists

Rolling back malaria

Malaria kills one million people each year. Ninety per cent of these deaths occur in the sub-Saharan region of Africa, where one in five child deaths is due to malaria. This is an immense human tragedy, all the more poignant because malaria is both preventable and curable.

That is why ExxonMobil is supporting the World Health Organization's *Roll Back Malaria* movement,

Health management



Ninety per cent of deaths due to malaria occur in sub-Saharan Africa. ExxonMobil hopes that the *Roll Back Malaria* programme will go some way to reversing this trend.

alongside the governments of several malaria-infected countries, the United Nations Development Programme, UNICEF and the World Bank. Through country and local community partnerships, *Roll Back Malaria* promotes such measures as the use of insecticide-impregnated bed nets and new technologies and medicines to control and treat malaria.

Specifically, ExxonMobil is providing practical logistics support as well as funding for an enhanced programme in at-risk areas of operation such as Angola, Cameroon, Chad, Equatorial Guinea and Nigeria. The company is also helping to fund leading efforts such as the *Harvard Malaria Initiative* and the *Medicines for Malaria Venture*, which hopes to develop new anti-malarial drugs through private-public research partnerships.

Going with the flow

ChevronTexaco's most recent health care programme in Nigeria is the River Boat Clinic. Its concept is simple: If you can't get to the hospital, the hospital will come to you.

Catering to the health needs of people along the remote Esravos and Benin River areas in the Niger Delta, the floating clinic travels to the towns of Madangho, Opuama, Opia, Benikrukru, Dibi, Gbokoda and Adragbassa on designated days of each week. At each stop, the River Boat Clinic's medical staff attends to the people of these towns as well as neighbouring villages. All treatments including the doctors' consultations and dispensation of drugs, are provided free of charge.

The floating clinic is a collaboration between ChevronTexaco and the Delta State government. ChevronTexaco provides the boat as well as funding for the purchase of equipment, drugs, dressings and other necessary supplies. The state government provides the medical staff, which consists of two teams on weekly shifts, each with one doctor, three nurses and one auxiliary nurse. The River Boat Clinic is currently treating some 700 patients every week.

Reducing the perils of paraffin

Paraffin is a convenient, efficient and clean domestic fuel, which is why more than half of all South Africans rely on it for cooking, lighting, heating and refrigeration. Annual usage is more than 900 million litres.

However, paraffin can be highly dangerous. If mistaken for water, for instance, its consumption causes chemical pneumonia. Incidents of paraffin-related fires and burns in the domestic environment—particularly in informal settlements—are also disturbingly high.

To address this issue, in 1995 the oil companies established the Paraffin Safety Association of Southern Africa (PSASA). PSASA has since distributed child resistant safety caps and bottles to ensure safe home storage. This effort was supported by a major public safety programme on television and radio, reaching more than 20 million people in 11 languages. In addition, PSASA has trained 1500 educators and community and health workers to conduct safety awareness workshops.

Evaluation programmes in affected communities have shown significant improvements in safety practices.

Above right: 'Sassy', a character devised to represent a paraffin bottle safety cap (child resistant enclosure), gets the children's attention.

Right: a community education programme under way to teach children about the risks of misusing paraffin.

Oil spill prevention and response

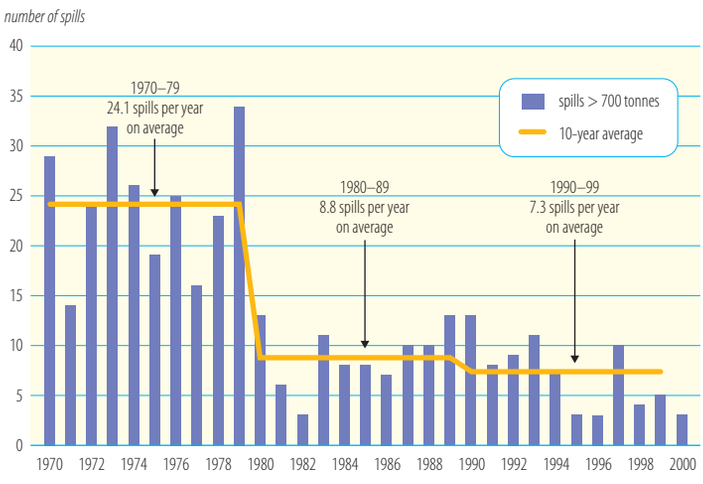
Background

Prevention of oil spills is of paramount importance to the oil and shipping industry. But accidents will still happen despite all best prevention efforts. Therefore, at the same time as our industry works diligently towards minimizing spills, it also remains well prepared to respond to any spill that might occur. This is why the oil and shipping industry gives the highest priority to developing comprehensive and well-rehearsed contingency plans that will ensure a prompt response to anticipate, mitigate and minimize the impact of oil spills. Such plans must be sufficiently flexible to provide whatever response is most appropriate to the nature of operations, size of a spill and type of oil, as well as differences in local geography, climate and environmental sensitivities. An effective response will hasten recovery of any damaged ecosystem. At the same time, response options should be sought to complement natural forces to the fullest extent practicable.

Industry response

Since the 1970s, there has been a significant reduction in the number of large oil spills from tankers (see chart below).

Oil spills exceeding 700 tonnes, 1970–2000



In 1999 more than 3.2 billion barrels of oil were delivered by tanker to the USA. Less than 200 barrels of those were spilled.

This decline in spills can be attributed to the successful preventive actions of the International Maritime Organization (IMO) and the oil and shipping industry. Industry, working through their organizations IPIECA, OGP, the Oil Companies International Marine Forum (OCIMF), The International Tanker Owners Pollution Federation (ITOPF) and the International Association of Independent Tanker Owners (INTERTANKO) and two intergovernmental organizations (UNEP and IMO), designed and broadcast numerous means to prevent spills and to enhance preparedness and response to improve the ability to recover spilt oil and mitigate effects from spills.

Prevention

In the 1970s, IMO together with OCIMF, introduced Traffic Separation Schemes designed to control shipping in high traffic density areas. Implementation proved a significant breakthrough in preventing collisions.

Similarly, the oil and shipping industry, in cooperation with the IMO, successfully raised the standards of tanker construction and operation, vessel management, and crew performance by implementing international standards on ship management and watch keeping. During the past decade, OCIMF also recognized the need for a centralized system of collecting and storing data about vessels inspected by OCIMF members. The Ship Inspection Report programme (SIRE) was created to promote ship safety by maintaining an accessible database and making information available to all OCIMF members. This database enables companies to submit reports on the condition of tankers they

Oil spill prevention and response

In 2000, 99.9992 per cent of oil transported worldwide by sea was delivered safely.

charter and to examine similar information from other members to aid decisions on whether to charter a particular ship.

Preparedness and response

Spill preparedness and response has been, and still is, a major focus for the oil and shipping industry. In addressing the lack of expertise in managing and operating oil spill response equipment, industry established oil spill response cooperatives in strategic locations around the world. This ensures that equipment is expertly maintained with the ability to be transported and deployed effectively by fully trained personnel.

Those who conduct clean-up operations or who suffer damage as a result of an oil spill from a tanker need to be assured that they will receive prompt and adequate compensation. Voluntary agreements were established by the tanker and oil industries in the late 1960s until, under the auspices of the IMO, International Conventions were developed. These Conventions, like their voluntary counterparts, are funded by the oil and tanker industries. Today, more than 100 countries have ratified one, or a combination, of the Conventions, and compensation equivalent to many hundreds of millions of US dollars has been paid to victims of oil spills, without the need in the vast majority of cases for recourse to litigation. The system is therefore highly successful and demonstrates the commitment of the oil and shipping industry to ensure the prompt compensation of those who clean up and suffer damage as a result of tanker spills.

Though the frequency of large spills has clearly declined over the past 20 years (see figure on previous page), further improvements can only be made with enhanced cooperation between industry and government for a coordinated response, particularly at contingency planning stages. This is a cornerstone of the 1990 International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC Convention), which was developed by the IMO with the full support of the oil and shipping industry.

IPIECA Oil Spill Working Group

The IPIECA Oil Spill Working Group (OSWG), composed of oil company representatives and an international network of experts, has worked to produce a clear and credible industry consensus communicated through the IMO/industry GI Programme. The OSWG is responsible for a range of educational materials, including the widely acclaimed IPIECA report series. The reports cover subjects such as contingency planning, biological impacts of oil pollution on a range of habitats, impacts on fisheries, sensitivity mapping, exercise planning and a study of dispersants and their role in oil spill response. These publications, as well as those produced by other industry associations such as OCIMF, ITOPF and Intertanko, represent the oil and shipping industry views and standards on these subjects. As such they are widely used for IMO and industry training courses.

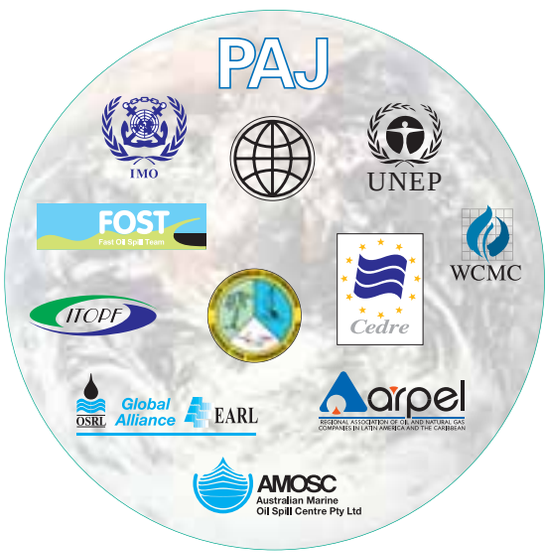
Above: the joint IMO/IPIECA report on sensitivity mapping; Volume 9 in the acclaimed IPIECA oil spill report series; a joint IPIECA/ITOPF briefing paper on international Tier 3 response centres; and the CD-ROM based video entitled *Working Together*, produced jointly by IPIECA and IMO

Oil spill prevention and response

Since the early 1990s, more than 700 double-hull tankers have gone into service worldwide. In 1999 the cost of these new ships was $7 billion.

IPIECA is the oil industry's focal point for communication and cooperation with national governments through the IMO. Between 1991 and 1994 IPIECA cooperated with the IMO to organize seven regional seminars on oil spill contingency planning, and in Cape Town in 1996, an IMO/industry Global Initiative (GI) Programme was established (see 'An IMO/Industry Partnership: The Global Initiative' case study on page 42). The GI programme encourages and, where possible, assists receptive countries to ratify the relevant international oil spill conventions, and encourages effective and sustainable national and regional oil spill contingency plans.

This formed the basis, through IPIECA, of a powerful and successful alliance between the IMO and the oil and shipping industry. In implementing the GI Programme, IMO has the experience and authority to persuade and influence national governments, while the industry provides essential technical expertise and resources. By communicating a consistent message, the IMO/industry GI is enhancing effective oil spill contingency planning around the world.



IPIECA's Oil Spill Working Group (OSWG) activities are supported by a number of organizations from the oil spill response community. These organizations strengthen the OSWG's expertise and credibility and include the IMO, the International Tanker Owners' Pollution Federation (ITOPF), the Tier 3 oil industry cooperatives and others.

Our industry is proud of its progress in reducing the frequency and severity of oil spills over the past 20 years. However, the risk of oil spills remains because of increasing use of petroleum as an energy source and increasing vessel traffic, so there is no cause for complacency. Industry continues to work with all parties concerned with spill prevention, preparedness, and response. We are committed to avoiding spills, and when they unfortunately do occur we are dedicated to ensuring an effective, damage-limiting response.

Gulf Area Oil Companies Mutual Aid Organization leads Gulf companies in focusing on marine environment protection

The Gulf Area Oil Companies Mutual Aid Organization (GAOCMAO) is among the leading organizations in the Gulf advocating a proactive approach to marine safety and environmental protection. GAOCMAO and its 12 member companies are focusing their resources and efforts on promoting the safe and environmentally responsible operation of marine vessels, terminals and offshore producing facilities to prevent oil spills and minimize pollution of the Gulf.

The Bahrain-based organization also remains dedicated to carrying out its original function when founded in 1972 as an oil spill cooperative of major industries operating in the Gulf. GAOCMAO members now have one of the largest ready reserves of spill response resources in the world, with equipment valued at more than US $100 million. They also have direct access to world class services and expertise that can be mobilized quickly for member companies to contain and clean up a major oil spill.

Oil spill prevention and response

Actions speaking louder than words

Case studies on oil spill prevention and response

Mutual aid in Malaysia

In 1993 Petronas initiated the Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG). Its aim is to provide responsible capability to manage, maintain and operate oil spill response resources, as well as to complement government efforts in the control and cleanup of oil spills. Open to all companies involved in upstream and downstream activities in Malaysia, PIMMAG also conducts 12 oil spill response courses every year to develop the relevant skills. In addition, PIMMAG participates in six oil spill exercises annually. These are conducted jointly by PIMMAG members and government agencies and are designed to enhance further cooperation and coordination between various local response agencies.

PIMMAG's operation forms an integral part of Malaysia's National Contingency Plan for oil spill control.

PIMMAG holds courses each year to help companies involved in both upstream and downstream activities develop the skills necessary to address the control and cleanup of oil spills.

Getting it right in Angola

In 1997 the oil and gas industry expressed concern over potential ecological threats posed by independent tanker movements along the coast of Angola. At the industry's initiative, operators and government officials gathered to discuss the implications of Angola's environmental laws, spill contingency planning, overall preparedness, and the importance of ratifying international conventions designed to protect the ecosystem.

Adherence to international response standards and conventions would, government representatives learned, provide Angola access to worldwide financial and technical resources in the event of a major spill. Benefits would be mutual, with reduced industry exposure, an increase in spill clean up capabilities and minimized response time and costs for everyone concerned.

Left: a training drill under way involving the deployment of booms

Above right: delegates at one of the IPIECA/IMO-sponsored workshops

Cooperation between industry and government was a keynote of the gathering to discuss these issues, which included a number of workshops sponsored by the IMO and IPIECA. The result was a National Oil Spill Contingency Plan for Angola. The plan contains detailed preparation on every major aspect of oil spill preparedness, response and environmental protection. It also covers risk analysis, sensitivity mapping, the use of dispersants and the importance of oil spill training and drills. The speed and efficiency with which all this was accomplished underscores the benefits of direct government and industry cooperation.

Today Angola qualifies under the terms of several international conventions for financial and technical assistance in the event of a major spill. Equally significant to both government and industry is the National Plan's development process, which serves as a model for similar planning at regional levels and provides a means of growing long-term positive relationships.

Oil spill prevention and response

A friend indeed

Chevron Texaco and the Sea Shepherd Institute of Brazil have joined forces in 'Friends of the Sea'. This is a partnered initiative that trains volunteers along the Brazilian coast to become qualified marine wildlife rescuers in the event of an oil spill.

Designed by Sea Shepherd, the programme encompassed five training sessions to provide marine wildlife rescue skills for more than 300 volunteers from 10 coastal locations. These locations were selected because of their significant ecological resources that could be vulnerable to oil spills.

Volunteers included a contingent from the Golfhino Rotador Project, a non-governmental organization working to preserve the spinner dolphins off the island of Fernanda de Noronha as well as students of UNISINOS University, in the south of Brazil. Collaborating in this project were international marine wildlife experts, who not only instructed the volunteers but made public presentations along the coast of Rio Grande Sul.

Through the 'Friends of the Sea' programme, volunteers receive training to become qualified marine wildlife rescuers in the event of an oil spill.

The Friends of the Sea partnership is part of a larger Chevron Texaco initiative to help create a network of coastal first-aid centres providing support and training for local groups to assist distressed marine animals.

An IMO / industry partnership: the Global Initiative

IPIECA

IMO

The OPRC Convention explicitly recognizes the importance of involving the oil and shipping industry in establishing oil spill response arrangements. The oil industry, wishing to respond positively to the objectives of the Convention, requested IPIECA to develop with IMO a basis for cooperative action. The first activity of this cooperative venture was the convening of a series of regional seminars from 1991–94, which were held in South-East Asia, the Mediterranean, Latin America, Africa, the Gulf, the Caribbean and the North-West Pacific. These involved more than 1000 senior officials and managers from government and industry from nearly 100 countries.

In March 1996, representatives of government and the oil and shipping industry from 33 African countries participated in the IMO/Industry Oil Spill Planning Meeting in Cape Town, South Africa. Government and industry experts from many organizations (i.e. World Bank, UNEP and ITOPF) in Europe, Asia, Australia and the USA also participated. The meeting goal was to promote capacity building and institutional strengthening at national and regional levels, to implement the OPRC Convention and to establish viable and sustainable oil spill response capabilities. It also ensured that all national delegates and international agencies and potential donors had a common view of what was needed for the successful development and application of the IMO/Industry Global Initiative in support of national programmes.

The main outcomes of the meeting included: a detailed action plan for the implementation of the Global Initiative with initial emphasis on Africa; education on the benefits and the importance of ratifying the relevant oil spill conventions; a plan for sensitivity mapping workshops in several African countries, oil spill training and exercises and joint IMO/industry technical missions in Angola, Madagascar, Mozambique and Namibia. The leverage of some $3 million from the World Bank to proceed with the Indian Ocean Islands project has enabled the development of oil spill contingency plans and the project is now near completion.

Since Cape Town, GI activities have spread to other areas of the world i.e. Caribbean, Caspian and Black Sea and still embody the spirit of the OPRC Convention. It is only through partnerships between both governments and the oil and shipping industry as well as with other international organizations that we can work together to encourage and improve effective and sustainable oil spill contingency planning around the world.

Oil spill prevention and response

Double hulls prove their worth

US law mandates that from 2015, only double-hulled vessels can call on American ports. Conoco began operating a 100 per cent double-hulled fleet of crude oil tankers in US waters as far back as August 1998. In December 1998, the company began operating a fleet of 100 per cent double-hulled oil tank barges in US Gulf Coast waters.

Double-hulled structures provide an additional measure of protection against oil spills. Unlike some other vessels, tankers' double hulls encapsulate the engine room, machinery spaces, fuel oil tanks and engine room bilge areas as well as all sides and the bottom of the vessels themselves. Conoco's two newest double-hulled tankers feature many safety and environmental protection innovations, including low-emission engines, an at-sea ballast system and a hull protection system—all meeting or exceeding marine regulations and standard practices.

When the *Guardian*, one of Conoco's double-hulled tankers, was rammed in 1997, not one of the ship's 550,000 barells of crude oil was spilled.

Internationally, delegates from IMO's 158 member states have agreed within the Marine Environment Protection Committee to a timetable that will see most single-hulled oil tankers eliminated by 2015.

Product stewardship

Background

Product stewardship is defined as a 'product-centred' approach to environmental protection. It denotes a management process designed to ensure that health, safety and environmental protection are integral to the design, manufacture, marketing, distribution, use, recycling and disposal of products and associated wastes. This concept recognizes that producers and manufacturers have responsibility to reduce the environmental footprint of their operations along with their products, leading to improved resource conservation and a sustainable economy. This means cooperation at every phase of the product's life to achieve workable and cost-effective solutions.

The industry is rigorously applying risk assessment and risk management principles to ensure locally and regionally applicable solutions and technologies. Such scientific assessment of products' health implications and evaluations of the carrying capacity of the local environment can determine potential impacts and lead to the best stewardship strategies.

Industry response

We aim to develop oil and gas products that are effective and meet consumer needs. It is also our responsibility to inform all people concerned about any necessary health and safety precautions throughout every stage of product life from production to storage, utilization and disposal. At the same time, the products we make must be designed to minimize both resource requirements and discharges into the environment.

Some of the strategies we employ include: reducing the use of toxic substances, designing for reuse and recycling and creating take-back programmes. Product stewardship, therefore, encompasses a broad spectrum of services to all the people who use or handle our products. Distributors and retailers, for instance, are an integral part of the product stewardship life-cycle. They are best placed to educate consumers to choose environmentally preferable products and to encourage consumers to return products for recycling.

For example, halon gas is widely used in the fire-fighting safety systems of oil and gas installations. Since halon has been identified as an ozone-depleting substance, the industry is phasing out systems that rely on halon and replacing them with equally effective alternatives.

American Petroleum Institute—encouraging the recycling of used motor oil

American Petroleum Institute

The American Petroleum Institute (API) has been at the forefront of product stewardship activities in the United States. The API 'used oil programme' is a prime example, helping consumers balance the need for automobile transport and clean drinking water through its innovative Used Motor Oil Program, which began in 1991.

The oil taken to a collection centre to be recycled saves energy and conserves natural resources. It can be reprocessed and used in furnaces for heat, or in power plants to generate electricity for houses, schools and businesses. Processed motor oil can also be used in industrial burners, mixed with asphalts for paving, or blended for marine fuels. It can also be made into lubricating oils that meet the same specifications as virgin motor oil.

To achieve all this, API members and their dealers have collected more than 100 million gallons of used motor oil from do-it-yourselfers (people who change their own oil) in 47 states and the District of Columbia. In 1991 when the programme began, API members operated 1800 collection drop-off centres. In 1997 that number increased to more than 12,200 drop-off collection centres. In addition, there are an estimated 26,0121 public and private collection centres operated by states and municipalities as well as automotive and oil-change service facilities. An estimated 240–259 million gallons of used motor oil were collected for recycling in 1997.

Product stewardship

One gallon of improperly disposed oil has the potential for contaminating a million gallons of drinking water.

Industry is implementing the broad scope of product stewardship by including the concept within its management systems. This closely aligns product stewardship with other corporate functions, such as environmental protection, health and safety, as well as research and development, marketing and manufacturing.

Typical actions undertaken include:

- developing the knowledge base for understanding the link between our products' formulations and their potential impacts;
- evaluating human and environmental product risks;
- developing and implementing management systems to reduce or mitigate risks; and
- working throughout our supply chain to ensure that the materials we use are properly evaluated before they reach us.

Though the precise set of activities may vary due to regional differences, the knowledge base created is universal in nature and readily transferable around the globe.

Such information is essential for:

- product registration—countries might request chemical producers to complete an evaluation of product hazards and to obtain regulatory clearance before a product can be introduced into their markets;
- hazard communication—proper evaluation and communication of health hazard and risk information is a critical component of any product stewardship programme; and
- product safety—proper labelling and safety information should be affixed to, or available with, every product and process stream shipped and sold.

Actions speaking louder than words

Case studies on product stewardship

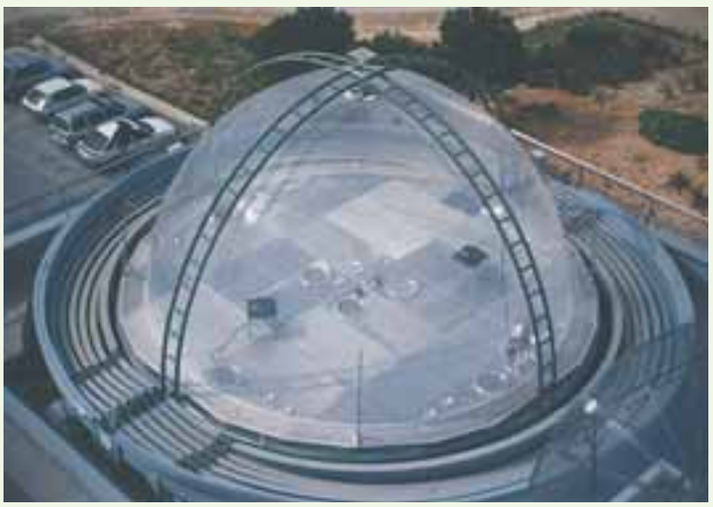
Determining atmospheric fate

Crude oil is a mixture of hundreds of hydrocarbons, which might be released to the atmosphere during the extraction, transportation and refining process. Hydrocarbon vapours in the atmosphere are also due to evaporation from storage tanks and product transfer operations. Lastly, motor fuel manufacturing and petrochemical processes involve a variety of products and intermediates, from which trace amounts may find their way into the atmosphere during their processing or final use.

These products participate in atmospheric and photochemical reactions and their degradation might lead to the formation of other compounds that may affect ecological systems and human health.

In 1997 TotalFinaElf decided to close the knowledge gap on the atmospheric fate of important hydrocarbon fuels by-products. TotalFinaElf initiated a research programme to develop a tool to rapidly analyse the atmospheric degradation scheme of the

Product stewardship



The atmospheric chamber in Spain was built with the support of the European Union for the joint TotalfinaElf/ University of Orleans research programme.

less known products. This programme, operated jointly by TotalFinaElf and the University of Orleans (France), aims to develop a screening tool that is able to predict the degradation scheme of unknown compounds. This was accomplished by constructing an atmospheric chamber able to reproduce free atmospheric conditions, including injections for trace constituents and complemented by appropriate sampling and analysis techniques.

TotalFinaElf plans to use this atmospheric screening tool before putting a new product on the market or incorporating it in a new formulation, to be sure that its atmospheric degradation has no impact on the environment or human health.

The experience gained by operating this programme also helps to understand the sources of atmospheric compounds that are crucial to elaborating air quality policies.

Corporate standards for worker exposure to chemicals

Global corporations such as ExxonMobil operate in countries with widely ranging regulations protecting worker health. As part of its corporate commitment to worker safety, ExxonMobil has established a number of corporate occupational exposure limits. These standards may be developed for substances not generally regulated or where the existing regulations widely vary. In fact, for ExxonMobil manufactured chemicals, this process precedes the

High production volume (HPV) challenge programme

The HPV Challenge Program is a voluntary programme between the US petroleum industry and the US Environmental Protection Agency designed to gather and publish health and environmental hazard information on HPV chemicals. These are defined as chemicals manufactured in—or imported into—the USA in amounts equal to, or exceeding, 454 metric tonnes per year (equivalent to 1 million pounds per year). The goal of the programme is to obtain a basic understanding of the toxicity of these HPV chemicals, their effects on plant, animal, and human health, and their final disbursement in the environment.

This voluntary testing includes basic physical, chemical, toxicity and environmental fate information on these chemicals. This is the first time this information will have been collected, organized, assessed and analysed in such a large scale in a collaborative, voluntary effort.

The information resulting from this programme will be made available to the public through a database that will be filled over the next several years with summaries of existing and new information on the hazardous characteristics of each chemical. The data to be collected, analysed and newly acquired, will be a valuable global resource, as most of the same products and chemicals are in commercial use worldwide. The industry views this information as essential so that consumers know how to use various products carefully and safely.

In order to execute this multi-million-dollars programme the oil and gas industry formed the Petroleum HPV Testing Group consortium. The American Petroleum Institute (API) administers the consortium, which is made up of 70 member companies representing 92 per cent of the US refinery capacity. The Petroleum HPV Testing Group works in conjunction with the US EPA, other trade associations, and non-government organizations (NGOs) to meet the HPV challenge, using the best scientific means available.

For more information visit the website of the Petroleum HPV Testing Group: **www.petroleumhpv.org**

Product stewardship

introduction of the product into commerce.

The standards are developed by ExxonMobil health scientists and, unlike many regulatory standards, must be reviewed every five years to ensure that they continue to reflect the best science available. The internal review process is similar to that established by the American Conference of Government Industrial Hygienists.

Establishing safe levels for occupational exposures is of limited value unless there is a reliable method to measure the chemical. Validating a method and protocol to measure the chemical is an important part of establishing a safe exposure level at ExxonMobil.

These standards not only protect ExxonMobil employees but also are provided to customers since they are included on product material safety data sheets. This allows these customers to take steps necessary to protect their workers.

A ROSE blooms in South Africa

Of the 360 million litres of lubricating oils sold annually in South Africa, 60 per cent are consumed during usage. Of the remaining 144 million litres, a substantial portion found its way into the environment, causing significant pollution of precious surface and groundwater resources. Some members of the South African Petroleum Industry Association (SAPIA) decided to do something about this.

Their first step was to set up the ROSE (Recycling Oil Saves the Environment) Foundation. ROSE's mission was to collect used lubricating oils for re-use in an environmentally acceptable manner. Since its inception in 1994, ROSE has established a network of more than 8500 collection tanks at service stations and workshops throughout the country. A ROSE website identifies the most convenient drop-off sites for mechanics.

Dedicated contractors then collect this oil for delivery to specially-designated storage depots (see inset). From there, the used lubricants are delivered for recycling. ROSE regularly audits all of the facilities involved in the chain to ensure that they adhere to stringent environmental standards. ROSE is fully sponsored by the oil industry in South Africa.

Safety

Background

Absolute safety in oil and gas operations is essential on both humanitarian and commercial grounds.

In the past 10 years the industry has made considerable progress in achieving this goal through a number of major initiatives across all sectors of our business. But we are not there yet. There are still too many injuries to our own people, contractors and the public at large.

An area in which we can note a degree of success is in the number of injuries that are sufficiently severe to require one or more days to recover. The frequency at which such injuries occurred in 2000 represented a reduction of more than 50 per cent compared to the 1992 figure.

Unfortunately, the rate of fatal accidents has not seen a similar decline. While we have managed to achieve some improvements since 1992, we can still do better. That is why we are continuing to identify root causes of incidents and develop health, safety and environmental (HSE) management systems to address these issues. Behind these efforts is our awareness that every fatality statistic represents a human life cut short; an individual tragedy for family, friends and colleagues alike.

Industry response

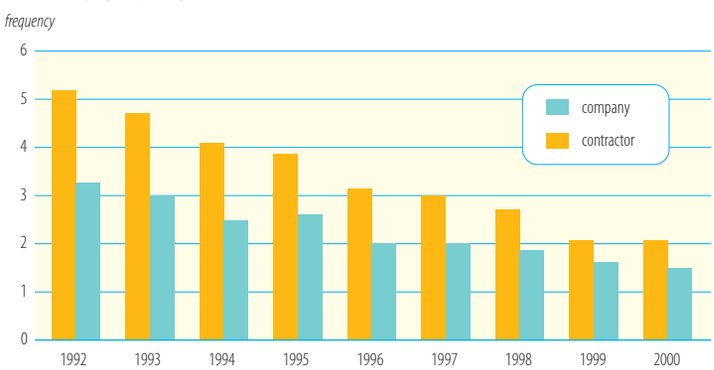
Many of the improvements in safety performance realized in the 1990s were the result of innovative engineering techniques and the introduction of more sophisticated safety management systems. In recent years, there has been an increasing focus on understanding how people interact with their working environments, and how this influences overall safety performance.

Working on the industry's behalf, OGP is continuing to collect more and better safety performance data every year. The number of yearly worker-hours on which oil and gas safety performance statistics is based has grown from 944 million hours in 1992 to 1634 million hours in 2000. This represents an increase in the level of activity in the upstream as well as recognition of the importance of understanding and sharing the industry's global safety performance.

Another achievement has been significant improvement in contractor safety performance—particularly important since contractor involvement in oil and gas operations is continuing to grow. The chart below compares the change in the Lost Time Injury Frequency (LTIF) of contractor personnel to that of company employees. In the course of a decade there has been a significant reduction in the LTIF of contract personnel, to a level similar to that of company personnel. This has been achieved through a range of initiatives—both within the contracting organizations themselves and the industry as a whole.

A range of initiatives taken throughout the industry as a whole has seen the lost time injury frequency of contract personnel fall significantly over the past 10 years.

Lost time injury frequency, 1992–2000



OGP's 1999 publication *HSE Management—Guidelines for Working Together in a Contract Environment* is a prime example of successful collaboration between the oil and gas operators and their contractor companies. This report is the result of a multi-industry working group involving participation of upstream organizations, contracting companies and trade associations. All had a common objective: to improve company and contractor health, safety and environmental performance in E&P activities.

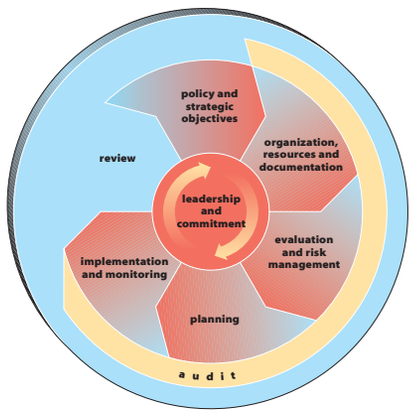
Safety

Safety management systems have been the focus of industry attention for much of the past decade, forming the basis on which we manage the risks to which our people are exposed.

In 1994, as part of our effort to improve the overall management of HSE issues, OGP published its *Guidelines for the Development and Application of Health, Safety and Environmental Management Systems*. This internationally respected document describes the main elements needed to develop, implement and maintain a management system in these areas and was instrumental in raising awareness of the issue.

As management systems have become more widespread, so has the move away from a prescriptive approach to managing safety issues. Instead, a more goal-oriented, risk-based approach is preferred. This involves identifying hazards in a structured manner, and putting control measures into place that are commensurate with the risks involved.

Incidents often centre around some form of human error. That is why recent focus has been on how best to understand the ways in which people interact with their working environment (meaning a combination of facilities, management system and other people). Further improvements in safety performance—particularly in bringing down numbers of fatalities—are anticipated by explicitly taking into account these human factors, making awareness and training in these areas a crucial step in our efforts to prevent injuries.



A visual representation of the Health, Safety and Environmental Management System (HSEMS) featured in the 1994 OGP publication *Guidelines for the Development and Application of Health, Safety and Environmental Management Systems*.

Of course, some injuries and fatalities occur beyond our facilities. The oil and gas industry makes use of air, sea and land-based systems to transport people to and from their workplaces. Reducing transport related incidents remains a key objective and has prompted a number of company-based initiatives.

Actions speaking louder than words

Case studies on safety

A safe bet in drilling

In deciding to use the new *Saipem 10000* drill ship, ENI went for the safe option. The new vessel, capable of drilling 9150 metres in water depths greater than 3000 metres, was designed and built in accordance with stringent maritime and industry practices, including those set out by the fourth

edition of the UK Health & Safety Executive's regulations. This involved preparing a voluntary safety case, including an assessment of all foreseeable accident scenarios, as well as the remedial actions and measures needed to reduce potential contingencies.

Among the state-of-the-art protection systems on board *Saipem 10000* are:

- sensors to detect fires and potentially explosive or toxic gases;
- a variety of active and passive fire protection systems;
- self-contained breathing apparatus near every berth and an adequate supply of devices for emergency squads;
- double-hull systems and assorted equipment to prevent sea pollution;
- fully-equipped infirmary with resident doctor;
- the highest classification of dynamic positioning, with systems in duplicate or triplicate to ensure constant effectiveness;
- a remote-control system for shutting down well control equipment and rapid disconnection of the pipes connecting the ship to the seabed well;
- a computerized emergency response system that automatically triggers a logical series of shutdowns once activated.

ENI's *Saipem 10000* helps position the company's drilling activities in a new era of prevention, integrated systems and advanced safety technology.

The road to safety in Africa

More than a million people around the world are killed in traffic accidents every year. Three quarters of those fatalities occur in developing countries. In Africa, the rate of fatalities per vehicle is about 30 times higher than in Europe or the USA.

Finding that road transportation often poses a higher level of risk than many other operations, companies such as Shell and ExxonMobil have introduced comprehensive programmes aimed at improving standards of vehicles and drivers. These programmes cover such aspects as:

- driver licensing and training by qualified instructors;
- vehicle and trailer checking, maintenance and certification; and
- vehicle safe loading weights.

The ExxonMobil Vehicle Safety Management Programme (VSMG), spanning both upstream and downstream operations, is being rolled out in 33 African countries. In addition to the basic programme, the company has also worked with vehicle manufacturers to ensure that truck and trailer designs meet VSMG criteria as

A step in the right direction

In 1997 the UK upstream industry launched a major new safety initiative aimed at substantially reducing the number of lost time incidents and fatalities occurring on UK-based installations. The name of the initiative was *Step Change in Safety*.

Step Change brought together employees, service companies, operators, trade unions, regulators and other representative bodies. Their overall aim was to improve the safety performance of the UK upstream industry by 50 per cent over a three-year period. They planned to do this through:

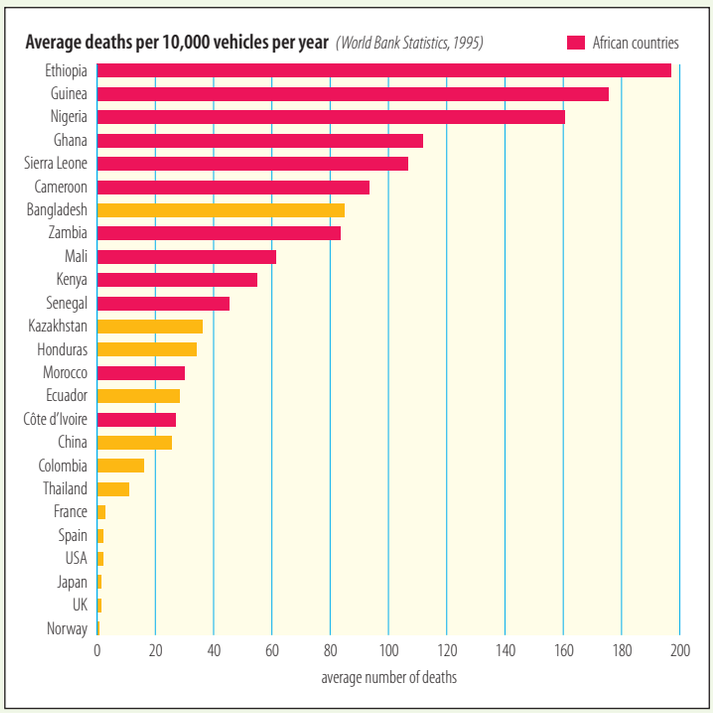
- engagement and involvement of all parts of the industry;
- cross-industry cooperation, sharing of good practice and learning from experience;
- personal leadership and commitment.

Step Change industry leaders demonstrated this commitment in the first year by publicizing their safety performance contracts. They also made resources—both financial and personnel—available to meet their overall objectives.

But it was not enough. By March 2001, the end of the three-year period, the industry demonstrated a 35 per cent improvement in the all injury rate, falling short of the 50 per cent target. Nevertheless, progress had been made, with individual companies reporting improvement rates of more than 80 per cent for the period.

Among the lessons learned were the need for greater safety involvement and engagement throughout the workforce, more demonstrable leadership, greater target clarity and persistence in following through on existing initiatives before implementing new ones.

Safety



Africa presents a significant challenge to programmes aimed at improving standards of vehicles and drivers.

well as tough African environmental conditions. Shell has introduced driver and contractor recognition schemes in many countries to promote awareness and changes in behaviour.

To provide critical training in defensive driving and fatigue awareness to drivers of heavy goods vehicles, Shell and ExxonMobil have been working jointly to create driving schools in Ghana, Guinea, Mali, Senegal, Togo, Burkina Faso, Cameroon, Côte D'Ivoire and Gabon.

Overloading of vehicles is a major road safety hazard in Africa.

As a result of these initiatives, there are already signs of improvement in vehicle safety performance. In Ghana, for example, the site of the first joint driving school, the number of truck accidents associated with ExxonMobil operations dropped from 8 in 1998 to 0 in 2000. ExxonMobil and Shell continue to work with other concerned organizations to enhance road safety performance wherever the companies operate.

Technology cooperation and capacity building

Background

There is a universal need for efficient technologies and management systems that help achieve sustainable development. At the same time, these technologies and systems can work to eliminate poverty, improve living standards and protect the environment. Local capabilities to assess, develop, manage and apply technologies are crucial to ensure long-term success.

Capacity building contributes to nations' efforts to develop their natural resources, improve their communication, transport and health services, and creates advanced national educational institutions, from which has sprung a skilled workforce, supporting industries and local entrepreneurial activity.

Capacity building, as defined in the 1995 IPIECA/UNEP publication entitled *Technology Cooperation and Capacity Building* (a report on the oil and gas industries' contribution to Agenda 21) is a process of constructive interaction between countries and the private sector. It is designed to develop the capability and skills to achieve environmentally and socially sound forms of economic development through the use of modern technologies, and management systems, a competent workforce and appropriate laws and regulations. A number of examples of such initiatives were highlighted in this joint publication (see box, below left).

'A template for success'

(extract from the UNEP/IPIECA publication on Technology Cooperation and Capacity Building)

The likelihood of maximum benefit to all partners will be greatly facilitated if a number of conditions are met. These include:

- a stable economic system and an attractive investment opportunity for investing partners;
- transparent and equitable legal and financial structure and sound environmental laws;
- realistic expectations from the host country and the communities of the benefits that may result from the partnership;
- a long-term commitment and dedication of resources by all partners;
- a fair distribution of benefits as a goal for all partners;
- respect for local culture and values;
- a safe and secure working environment for all employees and contractors; and
- no unnecessary barriers to movement of personnel and materials.

For more information on this publication, visit the IPIECA website at: **www.ipieca.org/publications/siaf.html**

Industry response

The oil and gas industry plays a key role in technology cooperation and capacity building. Often, this means helping host communities meet basic needs such as infrastructure, health, education, training, job creation and water supply. In other instances, we must focus on the need to balance community expectations so that all concerned—communities, industry and government—can carry out their appropriate responsibilities with respect to social and infrastructure investment.

Although industry's main priority is the building, commissioning and operating of core technology facilities, it is essential that the needs of the host countries and communities be respected. Therefore, partnerships are often initiated with a 'learning phase' in which the host country or local community sets out its needs and priorities and project activities are reviewed to ensure the use of national or local capabilities.

Providing education and training is an important part of capacity building. Companies seek

Technology cooperation and capacity building

out, make use of and develop, wherever possible, local expertise. They train and educate the local workforce and strive for the widest possible employment from the host country.

The realization of mutual benefit is one of the most important keys to success in technology cooperation and capacity building. Successful partnership is a 'win-win' process in which both the overseas partner and the host nation can reap substantial benefits. The overriding benefit resulting from successful ventures is the achievement of a sustainable balance encompassing environmental protection, economic development and social well-being. This includes:

- a fair return on capital to investing partners;
- increased economic prosperity for the host country;
- a cleaner and safer environment;
- a better trained and educated workforce;
- development of local enterprises;
- a stable operating environment;
- cost-effective implementation of environmental legislation;
- an enhanced image of private industry, and related long-term profitability; and
- improved environmental management in local enterprise.

South African Charter for black equity in industry

In November 2000, the oil and gas industry and the government of South Africa signed a Charter for the economic empowerment of historically disadvantaged South Africans in the industry. The Charter provides for black equity participation in the industry (a target of 25 per cent within 10 years has been agreed) and for the procurement by the industry of a similar percentage of its goods and services from previously disadvantaged entrepreneurs. The Charter also commits the industry to the development of human resources and to the creation of a culture supportive of empowerment. To ensure that this happens, the companies undertook to appoint as managers people who understand and support the spirit of the Charter.

Actions speaking louder than words

Case studies on technology cooperation and capacity building

Reaching out in Buenos Aires

In Argentina's densely populated capital, BG Group is spreading the benefits of its health and safety training expertise. The company is doing this through the gas distribution company MetroGAS, in which BG has a substantial holding.

A major feature of this outreach programme has been the construction of a dedicated centre—a life-size 'set'—in which emergency services can practice fire fighting and other utilities can receive training. In the year 2000 MetroGAS provided 6300 hours of technical safety training to employees of 28 different companies.

Safety is also taught to a broader audience of students in courses that focus on the hazards, as well as the benefits, of natural gas. MetroGAS teaches the correct use, properties and associated risks of the fuel, as well as stressing the safety measures to be considered at home. The programme also introduces students to a culture that encourages a heightened awareness of accident prevention and environmental care. In 2001, nearly 40,000 students participated in a programme that involved visits to two schools a day

Technology cooperation and capacity building

and the distribution of booklets and leaflets on health, safety and environmental issues.

In addition to these efforts, the company is helping young people in need of skills to enhance their employment potential. Working closely with the city, the MetroGAS Foundation also maintains a role in monitoring community needs and adapting programmes accordingly.

National company; global outreach

One of the most important missions of PETRONAS, the national oil company of Malaysia, is 'to contribute to the well-being of the people and the nation.' Since its inception in 1974, PETRONAS has been fulfilling this mission in a variety of ways, contributing significantly to the country's social restructuring through growth with equity.

Through its rapidly expanding and diversifying operations upstream and down, PETRONAS has created various spin-offs to benefit Malaysia and all its people. These include employment opportunities, infrastructural development, technology transfer, skills development, revenue generation and foreign exchange earnings through import substitution. Through its dealer and vendor development programmes, PETRONAS has also helped create subcontracting and entrepreneurial opportunities in areas that had previously relied on a subsistence rural economy.

As PETRONAS has grown to become an international company with operations in more than 20 countries, so has its mission to contribute to the well-being of host populations. Educational efforts in these directions include the company's own institute of higher learning: Universiti Teknologi PETRONAS (UTP). Thanks to these educational programmes, the corporation has been able to build a strong and highly skilled human resource base to meet the needs of Malaysia as well as its host nations. To date, PETRONAS has provided educational assistance to more than 13,000 students from Malaysia, Vietnam, Thailand, South Africa, Sudan and Turkmenistan.

Graduation day at the company's own institute of higher learning—the Universiti Teknologi PETRONAS

Holding hands; not handing out

Just down the road from BP's Galeota Point complex in Trinidad—generator of a significant portion of the nation's wealth—is Mayaro, one of Trinidad's poorest communities.

BP first became involved in social issues in Mayaro when it decided to participate in the government's Adopt-a-Community programme in 1998. Today, commitments range far and wide from a roadside beautification programme and security for fishermen at night to training and scholarships in industrial skills, steel band sponsorship and help in generating tourist development.

All of this began with a consensus-building workshop. The resulting report identified Mayaro's social needs. Most important of all, a steering committee with extensive community representation was established to mobilize community efforts, with empowerment as their theme.

Photographs by Jeff Chock

BP's participation in the government's 'Adopt-a-Community' programme is helping the people of Mayaro address a wide range of social needs.

Technology cooperation and capacity building

For the people of Mayaro, part of this empowerment is the realization that the health of a community can not rely on one employer—or one benefactor. Courses and training in such skills as hotel management, turkey-rearing and construction have all played a part in the programme. A feasibility study is currently under way on the possibilities of a trade school or multi-skill centre to further expand these efforts.

Bringing business opportunities to Oman

'Intilaaqah' is a special help programme supported by Shell that trains young people in Oman to start up and run their own businesses. Devised in 1995 to run in tandem with the Sultanate's own drive for Omanization, the programme has since trained more than 350 Omanis, many of whom had been unemployed.

Many are now in charge of their own enterprises, providing job opportunities for scores of fellow Omanis. Even participants who chose not to pursue an entrepreneurial career have found that their employment prospects in the public and private sectors have increased considerably.

The success of Intilaaqah has inspired other Omani companies, including local banks, to participate. As a result, the original intent to train young unemployed people has widened. Now, a number of mature students have gone through the programme and set up their own businesses—further widening the circle of Intilaaqah-based capacity building.

Involving Angolans in oil's future

Norsk Hydro's ambitious Management and Technology Transfer Programme for Angola was launched in 1998. This extensive training and education programme aims at building up the competence and experience of people at Sonangol, the state oil company, and giving students an advanced international education in oil-related subjects.

Norsk Hydro's Management and Technology Transfer Programme provides students with an advanced education in oil-related subjects.

The initiative involves the recruitment of high-potential candidates at university level, with the process focusing more on learning ability than actual knowledge. The candidates are granted scholarships and then given the necessary language training before being fully integrated in an intensive educational course, leading ultimately to post-graduate or doctoral level. One Angolan geophysicist is currently undertaking a master's programme in petroleum science at the Norwegian University of Science and Technology.

In parallel, the programme offers on-the-job training to selected Sonangol employees in Norsk Hydro or at professional training institutions. Three recruits are already working for Norsk Hydro Angola and nine for Sonangol.

By the end of 2005, the Norsk Hydro programme will have been responsible for training and developing some 65 highly-qualified professionals for top positions in the Angolan oil sector.

Training tomorrow's engineers in Indonesia

Caltex (now part of ChevronTexaco) is not only an energy company. In Pekanbaru, Indonesia, it is also a school—the Caltex Polytechnic near the company's Rumbai camp. Focusing on information technology, mechanical and electrical engineering and related subjects, the Caltex Polytechnic opened in September 2001 as the first facility of its type in Central Sumatra.

Technology cooperation and capacity building

The Caltex Polytechnic near the company's Rumbai camp in Indonesia— from construction to the official opening in 2001

The project fits neatly into the Riau region's human resources development planning, as well as national policy on the development of polytechnic education. The overall aim is the empowerment of local people to utilize the region's natural resources and enter national and global markets.

Enrolment is already oversubscribed, though more students will be accommodated as the complex is gradually completed. Among the educational staff are many Caltex employees who are volunteering their time and expertise as instructors.

Creating Caspian entrepreneurs

ChevronTexaco's Small and Medium Enterprise (SME) programme reflects a significant change in the company's community assistance philosophy. Unique to the region, the idea behind SME is to promote grass-roots financial strength.

The programme is based in Atyrau, Kazakhstan—some 300 miles north-west of the massive Tengiz Field, which the company has operated since 1993. Partners in SME include the United Nations, the European Bank for Reconstruction and Development and the US Government. By mid 2001 SME's Atyrau Business Advisory Center had helped prepare nearly 200 business plans, of which more than 25 per cent were approved for loans. These included projects for Atyrau's first bowling alley and supermarket.

Another 2150 smaller, no-collateral loans dispensed by SME helped to establish independent dressmakers, bakeries and food processors. Loans at the larger end of the scale went to firms planning to become suppliers of goods and services to Tengizchevroil, the Tengiz Field's operating company.

Private entrepreneur Tatyana Baismakova runs a school canteen in Atyrau city—she received credits from the Atyrau 'Microcredit Programme'.

Based on successes in Atyrau, new SME projects include expansion of the programme to other districts of Atyrau province and other rural areas.

Also in 2001, Atyrau's city government donated space for a business incubator created as part of SME's Business Advisory activities. Citibank loaned $100,000 to the project, and the incubator has drawn interest from Tengichevroil and AKNCOC, the offshore company operating in Kazakhstan's northern Caspian Sea.

As the SME catchment area widens to benefit the broader Tengiz community, so does the economic sustainability it is building. SME has not only fostered small and medium entrepreneurs, it has also spawned a network of previously non-existent business advisory resources.

In this way SME is adding value on both sides. Rather than simply a funding source, ChevronTexaco has become an active community partner and problem-solver, helping Kazakhstan to become stronger, more self-sustaining and healthier. For a newly independent country and new partners, the SME programme is an example of growing together.

Gulmira Sadykova received credit for the third time to run a cosmetics shop.

Technology cooperation and capacity building

Encouraging local entrepreneurs in South Africa

As far back as 1962 TotalFinaElf in South Africa has followed a consistent policy of identifying potential entrepreneurs in disadvantaged communities for training and empowerment as service station dealers. Today, some 150 TotalFinaElf service stations are owned/operated by local businesspeople. They employ some 3000 men and women who, in turn, support about 10,000 dependents.

TotalFinaElf has also promoted capacity building in the areas of construction, distribution and small contracts—actively pursuing a policy of involving disadvantaged contractors and suppliers. In an average year, the company allocates some 25 million Rands to local contractors. To facilitate these efforts, the company enjoys a very close working relationship with the National African Chamber of Commerce, the Black Management Forum and the National African Farmers' Union.

Internally, TotalFinaElf has embarked on a highly successful training programme for potential managers in South Africa, run in conjunction with the Paris Chamber of Commerce.

All of this is part of a larger management philosophy: to play a meaningful role in improving the quality of life of all the people of South Africa. To that end, TotalFinaElf is involved in a wide range of projects, including day care centres for farm children, street-law courses, adult education in both literacy and vocational skills, community projects such as vegetable gardens and tree nurseries, a string orchestra in Soweto and the Sibikwa Community Theatre in Benonoi.

Urban air quality

Background

A half-century of rapid industrialization and urbanization in many countries has played a major role in economic development. In many cases, it has also resulted in poor air quality in cities and connected communities.

In many countries, including those in the OECD, air quality concerns in the past 30 years have led to the development of specific legislation to control emissions to meet ambient air quality goals. In general, this has worked, and in most of these countries air quality has been improving in the past decade due to controls on both vehicle and stationary source emissions. In fact, the most advanced vehicles in use today are over 98 per cent less polluting than new vehicles were three decades ago.

The same progress is not evident in developing countries, where deteriorating air quality in rapidly growing urban centres continues to be a challenge, exacerbated by increasing congestion and infrastructure limitations.

Industry response

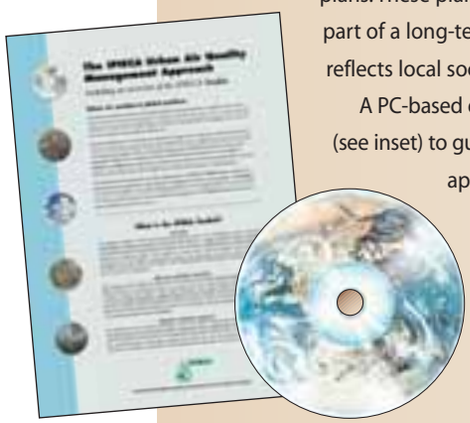
The most immediate step the oil and gas industry can take to improve air quality is to reduce the impact of emissions from our own operations. This is under way, using a variety of techniques.

Cogeneration, for example, is reducing energy consumption in oil operations by up to 30 per cent. For one company alone, the energy thereby saved is equivalent to 25 per cent of all the electric power currently generated by wind and solar facilities worldwide—enough to meet the residential needs of more than 3 million households.

Urban air quality planning: an integrated approach

In 1995, IPIECA formed the Urban Air Quality Management (UAQM) working group to communicate realistic and effective approaches on air quality control to stakeholders in developing countries. The target audience included local and national governments involved in devising programmes for their growing urban population centres.

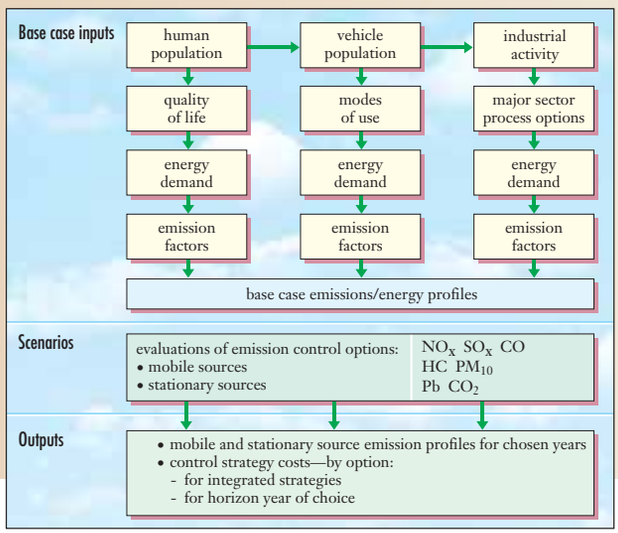
The UAQM working group developed a simple process to help stakeholders prioritize air emission problems and select the most cost-effective controls. An integrated framework was devised which reflects the experience gained by our industry during the development of air quality improvement programmes in both developed and developing countries. While providing a strategic and comprehensive guide to urban air quality, this approach also encourages the development of science-based, cost-effective management plans. These plans consider all sources of pollution and form part of a long-term air quality improvement strategy that reflects local social and economic conditions.



A PC-based emission-forecasting *Toolkit* was developed (see inset) to guide air quality planners in the technical application of the framework and the subsequent implementation of the most locally appropriate air quality policies. IPIECA's mission is to encourage, facilitate and support the adoption of this methodology through provision of publications, seminars, regional workshops and training—all supported by the *Toolkit*.

Application of the IPIECA *Toolkit* is under way in a number of locations including Lima-Callao (World Bank CAI), Rio de Janeiro (CAI Rio/Petrobras), New Zealand (Shell/New Zealand Government) and South Africa.

A schematic diagram of the *Toolkit* process



Urban air quality

In refining, survey data compiled by the highly-respected Solomon Associates shows an 8 per cent improvement in the energy intensity (million BTUs consumed/utilized for equivalent distillation capacity) between the years 1992 and 1998.

The industry—in collaboration with the automotive sector—is working equally hard to reduce the air quality impact of transportation fuels. The joint objective is cleaner, more efficient fuel/vehicle systems. To that end, our industry has co-funded and supplied technical experts to extensive research programmes in the USA, Europe and Japan. Major programmes include the Auto/Oil Programmes, European Programme on Emissions, Fuels and Engine Technologies (EPEFE) and the Japanese Clean Air Programme (JCAP).

To capitalize on the results of these programmes, we have also made major investments in refineries to provide fuels to improve air quality and enable advanced low emission vehicle technology. Examples include reformulated gasoline (such as California Clean Burning Gasoline, and Euro 2 and 3) and plans to reduce sulphur in many locations.

Phasing out leaded gasoline

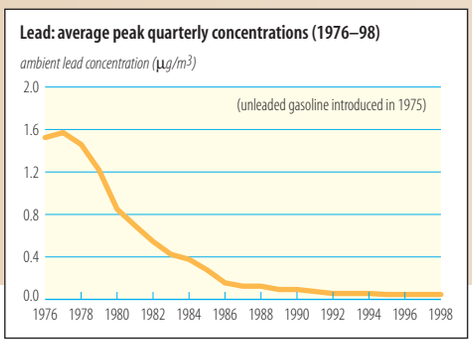
One issue that remains of particular concern to the industry is the continuing presence of lead in gasoline. Although 85 per cent of gasoline sold worldwide is lead free, leaded gasoline is still being sold in nearly one-third of all countries.

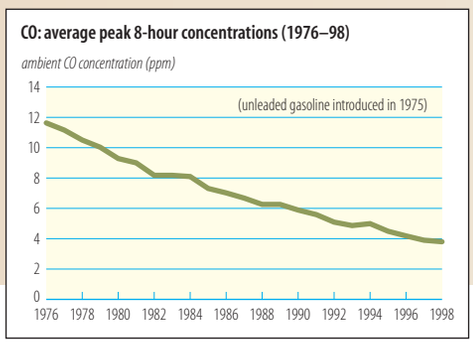
The presence of lead harms vehicle catalytic converters and precludes the use of vehicles equipped with such technology to reduce emissions and help clean up the air. Charts below demonstrate the substantial reductions in ambient concentrations of lead, carbon monoxide and ozone achieved in the USA in the 23 years following the phase out of leaded gasoline and the introduction of catalytic converter-equipped vehicles.

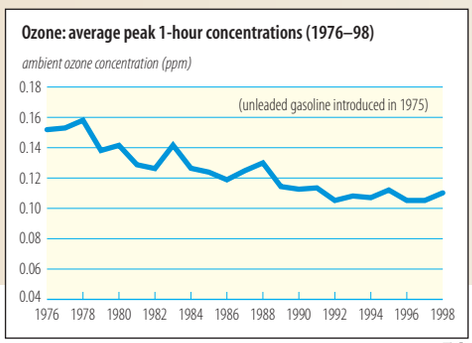
Phasing out leaded gasoline must be considered the first step toward cleaner air for any developing country. Therefore, our industry has adopted a formal position with the United Nations to encourage governments in countries still using leaded gasoline to develop phase-out action plans and, ultimately, mandate the elimination of lead alkyls as an additive. Objectives of the lead phase out initiative are to: raise awareness about the environmental benefits in key targeted countries; build consensus among stakeholders on main issues and priorities; and design preliminary action plans at both national and sub-regional levels.

Through IPIECA, the oil and gas industry supported—and was a major participant in—the World Bank Regional Conference on the Phase Out of Leaded Gasoline in Sub-Saharan Africa held in Dakar, Senegal, in June 2001. This gathering, sponsored by ExxonMobil, brought together representatives of government, industry and NGOs and was an unqualified success. Government representatives from 25 countries agreed to phase out leaded gasoline by a target date of 2005. IPIECA is working with the five sub-regional working groups established at this conference to develop action plans to help achieve that target.

Similarly, on a national basis, the Australian Institute of Petroleum (AIP) has been working with the government and automotive industry for the past five years on a staged lead content reduction in petrol manufactured at Australian refineries. AIP has also liaised closely with the automobile associations to carry out a wide-ranging education programme aimed at highlighting those older makes and models of vehicles that can run successfully on unleaded petrol. AIP's objective is for virtually all of Australia's vehicle population to be running on unleaded petrol well in advance of the government's deadline of 2010.







Urban air quality

Investments in these areas have contributed to a significant reduction in vehicle emissions in many developed countries, despite an increase in vehicle miles travelled. In the USA, carbon monoxide (CO) emissions from motor vehicles have decreased by 56 per cent over the past twenty years.

Of course, neither our industry nor the automotive sector can claim sole credit for progress in emissions reduction. Involvement of local communities, government, academia and consumers is essential to successfully tackle air quality issues.

The launch of the World Bank Clean Air Initiative (CAI) in 1998 is an example of this cooperation in action. In December 1999, the oil and gas industry participated in the Latin American CAI Steering Committee, together with the Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean (ARPEL). Industry involvement ensured the development of a structured and integrated approach to the development of legislation to reduce emissions and improve air quality. As part of this programme, the IPIECA *Toolkit* (see case study) was made available to the participating cities and has played an important role in the continuing development of the Latin American CAI.

In the USA clean fuels, cleaner cars and cleaner industry operations account for 70 per cent of America's emission reductions since 1970. In just over 30 years, emissions have declined 31 per cent while vehicle miles increased 140 per cent and the gross domestic product increased 147 per cent.

Actions speaking louder than words

Case studies on urban air quality

Fuel improvements in Malaysia: phasing out leaded gasoline; phasing in natural gas

Motor vehicle emissions are a major source of air pollution in Malaysia's urban areas. To improve air quality, reduction of lead in gasoline was done in stages, beginning in 1985 with a reduction from 0.85 to 0.4 g/l and from 0.4 to 0.15 g/l in 1990.

On 1 January 1990, Petronas led the way in introducing unleaded dual fuels in Malaysia. A year later, all oil companies stopped selling leaded gasoline. Correspondingly, airborne lead concentrations in Kuala Lumpur showed a ten-fold reduction from 1 µg/m^3 in 1989 to 0.1 µg/m^3 in 1998.

Petronas is aiming to establish 162 'natural gas for vehicles' (NGV) outlets, such as the one shown here, throughout Malaysia by 2006.

Even before those efforts, Petronas embarked on the Peninsular Gas Utilization (PGU) project to supply gas as an alternative cleaner energy source to the industrial, commercial and residential sectors. As part

of this effort, Petronas introduced the use of natural gas for vehicles (NGV) with a pilot project using 21 vehicles from their own fleet. This was in 1986. In July 2001 Petronas made NGV commercially available from 20 selected service stations to 4000 vehicles in Kuala Lumpur and its vicinity. The target is for 162 NGV outlets throughout Malaysia by 2006.

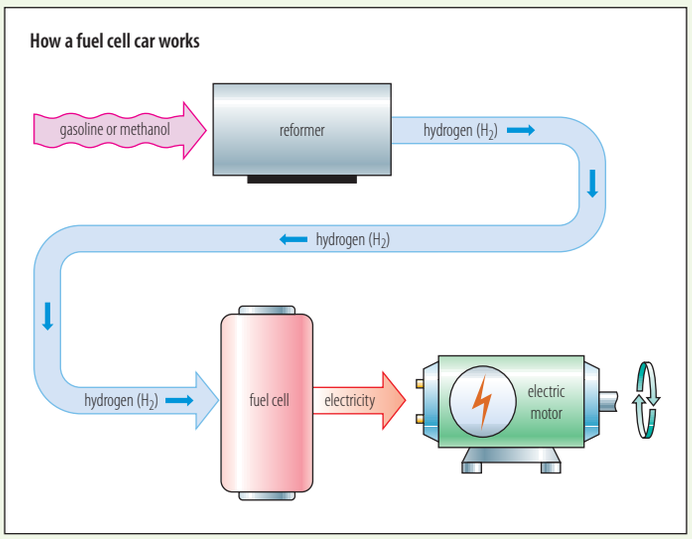
Since the introduction of the PGU project in 1984, the share of gas has increased from 5.9 per cent of total energy demand to 8.3 per cent in 1990 and 11.1 per cent in 1999.

Collaborating on fuel cell technology

Fuel cell technology is an option that has the potential to improve significantly the fuel efficiency of motor vehicles while reducing emissions from transportation—should it become viable and economic. ExxonMobil is working with both General Motors and Toyota to develop technologies supporting an onboard gasoline processor for fuel cell vehicles. Fuel processors use gasoline as a fuel to create hydrogen. This hydrogen is then used by the fuel cell to power vehicles. The ExxonMobil/GM/Toyota team has designed, built and run a number of gasoline processor primary reactor configurations. Each auto company has a target to demonstrate a gasoline-powered fuel cell vehicle within two years.

ExxonMobil, BP, Shell and ChevronTexaco are members of the California Fuel Cell Partnership, a public-private venture to demonstrate fuel cell vehicles in California and explore paths to commercialization of this technology. The partnership is currently evaluating fuel cell vehicles, primarily buses using hydrogen, methanol and gasoline.

Also participating in the California Fuel Cell Partnership—which began in April 1999—are: auto manufacturers DaimlerChrysler, Ford, GM, Honda, Hyundai, Nissan, Toyota and Volkswagen; and fuel cell companies Ballard Power Systems, International Fuel Cells and XCELLIS. Government agencies involved are the California Air Resources Board, California Energy Commission, US Department of Energy, US Department of Transportation and the South Coast Air Quality Management District. The fuel aspect of the fuel cell vehicle plays a crucial role for the successful deployment of this technology and its acceptance by the consumer. Gasoline fuels for fuel cell vehicles offer the advantage of using an existing and familiar distribution infrastructure that would avoid costly capital outlays for alternative distribution systems.



In a fuel cell vehicle gasoline is used to create hydrogen which, in turn, is processed by a fuel cell to generate electricity.

Clean cities programme

If freedom of mobility has a downside, it is the growing numbers of vehicles polluting the air of the world's major cities. In consequence, governments are imposing new and tighter standards on fuel quality and vehicle emissions.

Meanwhile, as part of its Clean Cities Programme, BP is introducing cleaner fuels that substantially reduce emissions without sacrificing ease of mobility. This creative, progressive approach is based on the premise of regarding the vehicle and its fuel as a single system, with fuel technology keeping pace with vehicle technology. For gasoline, this means unleaded fuel with low benzene and sulphur content—or no sulphur at all. For diesel, low sulphur is also a priority. Overall the objective is to enable motorists to get the

Urban air quality

best possible emissions performance from their vehicle, thereby improving urban air quality.

When BP launched the Clean Cities Programme in 1999, the company committed to making cleaner fuels available in 40 cities worldwide. In fact BP exceeded this target, with a total of 59 cities by the end of 2000 and 90 cities by the end of 2001.

Issues vary in individual locations. In Johannesburg and Istanbul, for example, the greatest urgency is in removing lead from gasoline. In Western Europe and the USA, the prime concern is over sulphur levels. Wherever the programme operates, however, the outcome remains the same: cleaner urban air for all.

Cleaner rickshaws, healthier air

In six Indian cities alone, poor air quality due to traffic emissions contributes to the deaths of 40,000 people a year. To reduce this toll, BG Group has embarked on a pilot scheme to improve emissions from urban India's most prevalent mode of transport, motorized rickshaws.

Motorized rickshaws are common throughout India

Normally, these rickshaws are driven by an inexpensive blend of petrol that gives off considerable quantities of particulates, carbon monoxide and oxides of nitrogen. When, as is often the case, the petrol is mixed with kerosene to make it go further, the emission problems are made worse.

However, in Surat, one of the six cities, things are beginning to change. There, the population of 2.4 million is seeing the first benefits of a trial programme that converts rickshaws to run on compressed natural gas (CNG). The conversion process, which is certified by the government, is simple, takes six hours and costs 18,000 rupees (about £170) per rickshaw. The result is an exhaust that produces virtually no smoke and delivers a 55 per cent reduction in CO, as well as significant reductions in NO_x, CO_2 and particulate matter.

The conversion of 150,000 rickshaws spread among the six cities would result in a significant improvement in air quality—and health—in these locations.

Testing new diesel formulations

An industry-government collaborative partnership was launched to plan and coordinate a demonstration programme to evaluate new ultra-low sulphur diesel formulations developed by BP. These fuels, known as ECD and ECD-1, enable the retrofit of heavy duty-vehicles such as trucks and buses, with diesel particle filters (DPF) that dramatically reduce diesel particulate matter (PM), total hydrocarbons (THC) and carbon monoxide (CO) emissions.

This programme included industry, government and academic participants, all of whom were directly involved in the technical aspects of the programme as well as its funding. The year-long project consisted of two rounds of vehicle tests to characterize emissions. Seven vehicle fleets were involved, encompassing more than 150 vehicles. Testing was conducted using a transportable chassis dynamometer laboratory designed and operated by West Virginia University for the US National Renewable Energy Laboratory.

Urban air quality

The collaborative approach allowed for:

- leveraging of funding to permit testing of a large number of vehicles;
- broad dissemination of results among participants and in scientific papers in the open literature; and
- a mechanism for directly comparing commercially available diesel fuels with advanced low-sulphur formulations, synthetic diesel (Fischer-Tropsche) and compressed natural gas.

Global energy management system cuts emissions

ExxonMobil has improved the energy efficiency of their refineries and chemical plants by 37 per cent between 1973 and 1999. Over the past two years, they have launched the Global Energy Management System (G-EMS) to further improve and sustain energy efficiency at their refineries and chemical plants worldwide. G-EMS provides the capability to reduce plant energy consumption by an additional 15 per cent or more.

At the heart of G-EMS is a set of 'best practices' for operation, maintenance, control, and design of plant facilities, which were compiled by internal experts who researched both within and outside the company. The common methodology provided by G-EMS allows each of their plants to identify gaps relative to these 'best practices', develop a gap closure plan, and measure and track ongoing results.

The rigorous, comprehensive rollout of G-EMS is key to achieving the maximum energy efficiency benefits from the system. The interactions between the rollout teams and the plant personnel in each refinery and chemical plant across the world lead to improved work practices for existing equipment, enable identification of investment opportunities to further improve energy efficiency, and lay the groundwork for sustained results through measurement, accountability, and technical support. Example improvements include more frequent cleaning of heat transfer equipment and installation of facilities to generate additional electric power and steam from existing plant processes.

In summary, G-EMS provides significant economic and environmental benefits and enables ExxonMobil to maintain industry leadership in energy efficiency.

Waste management

Background

What do we mean by waste management? The industry definition encompasses re-use, recycling, reduction and disposal throughout every stage of operation from exploration and production through to refining, marketing and distribution of finished products. Looking beyond that, it also covers our products' entire lifecycles.

Many aspects of waste management are covered by regulation at national, regional and international levels. Regulatory requirements are embodied in licences granted for every stage of our operations. In many respects, the industry not only complies with these regulations but also exceeds them—often as a result of sharing and improving practices through national and international industry associations.

The industry is applying risk assessment and risk management principles rigorously to ensure locally and regionally applicable solutions and technologies. Scientific assessment of this sort can determine potential impacts and the best waste management strategy. Only in a few cases is there a 'one size fits all' solution.

Industry response

Management of wastes, residuals and out-of-specification products is an integral part of our industry's operations. It empowers our operators—along with the entire supply chain—to make appropriate choices. Consumers' engagement is also a vital part to our multi-pronged approach of reducing, recycling and re-using otherwise discarded products.

The industry carries out environmentally acceptable waste disposition according to a recognized hierarchy of priorities: source reduction followed by recycling and treatment. We are constantly working with governments at local, national and regional levels to develop management programmes that encourage sound practices and benefit the public as a whole.

European refineries have achieved a 97 per cent reduction in aqueous effluents since 1970. Their SO_2 emissions have dropped by 40 per cent since 1980.

A variety of techniques and technological innovations are used as part of routine operations in various sectors of the oil and gas business:

- Drilling during oil and gas exploration and extraction can produce considerable quantities of rock cuttings coated with residual amounts of a lubricating agent known as drilling mud. These complex mixtures, which prevent well bore collapse while transporting cuttings to the surface, contain a number of additives and can be either water-based or oil-based. Because of environmental concerns over the discharge of cuttings in oil-based muds, we have put controls in place to minimize their use. In many areas, particularly those where risk assessments highlight a more acute environmental sensitivity, discharge of oil-based muds has ceased entirely.
- Produced water, which coexists with oil and gas in hydrocarbon reservoirs, is brought to the surface as reservoirs are developed. In oil fields in particular, quantities of produced water increase as reservoirs mature. In some cases, eventually more water is produced than oil. Produced water therefore can constitute the largest releases from the upstream sector. To ensure the high quality of this discharged water, producing areas apply rigorous regulations or standards.

Waste management

- In refining, sludge coking is a recognized and widely used practice in which the heavy organic constituents in refinery waste are converted to petroleum coke while light hydrocarbons and water are vapourized, recovered and reused. Refiners have optimized their processes by recycling oily wastes during part of the coker cycle, or by transforming recovered hydrocarbons into asphalt, which can then be offered to local communities for use as road surfacing.

Prevention of gas or fumes from escaping into the atmosphere is an overriding objective in all our operations, including production, refining and product transfer. Venting and flaring have been significantly reduced in all of these activities. Changes to operating procedures and installation of vapour recovery units have also reduced atmospheric discharges from tanker loading operations, product distribution, terminals and fuelling stations.

Crude oil undergoes a variety of specialized transformations in refineries to turn it into a wide assortment of products. The process of removing naturally occurring impurities from raw crude unavoidably results in the generation of by-products that must be managed—either by recycling, treatment or disposal. The majority of recycling residuals fall into three categories:

- Substances added to absorb petroleum contaminants such as hydrogen sulphide, which are then removed;
- Micro-organisms used to purify water needed during the refining process;
- Solids present in crude oil or generated either in the process of cleaning up spills or excavating refinery construction sites.

Over the past 15 years, refineries have documented the effective measures they have taken to operate more efficiently, conserving resources and generating less waste for disposal. According to the most recent data, refineries now recycle 62 per cent of refinery residuals versus 26 per cent in 1985. Solvents, resins and other materials are restored for re-use within the refinery or elsewhere. Another 21 per cent of refinery residuals are treated to reduce their volume and/or toxicity before disposal. The volume of refinery residuals sent for direct disposal fell from 28 per cent in 1985 to 18 per cent in 1997.

Operational discharges of oil into the marine environment from European production platforms have been reduced by 64 per cent

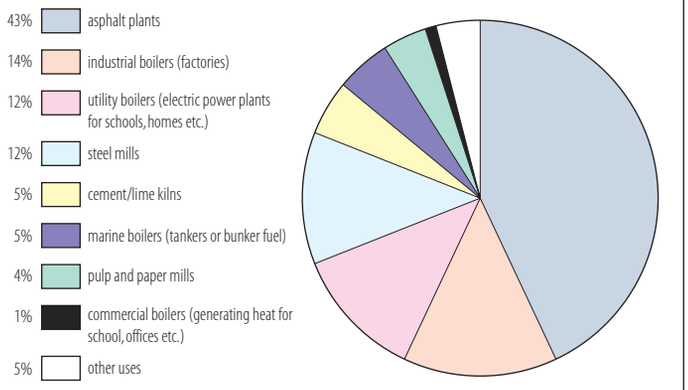
A large portion of our products is used in motor vehicles, which are an indispensable fact of life for a significant part of the global population. Motor oil does not wear out. It just gets dirty. Therefore, what we do with the used oil from these vehicles plays an important role in balancing our desire for convenient transportation with the imperative for a clean and healthy environment now and in the future. By recycling used motor oil we keep it out of rivers, lakes, streams and ground water. In many cases that means keeping it out of our drinking water, off our beaches and away from wildlife.

Our industry is promoting the development of multiple recovery and reuse operations for used oil such as burning for energy recovery or re-refining to base lubricants oil using modern technology. Many regional petroleum industry associations around the world have instituted used oil management programmes to educate consumers that oil taken to a collection centre for recycling saves energy and conserves natural resources.

Reprocessing is the most common method of recycling used oil in the US. Each year processors treat approximately 750 million gallons of used oil. Some 75 per cent of used oil is being processed and marketed and another 14 per cent is turned over to re-refiners who return used oil to its virgin state.

Waste management

Typical breakdown of consumption of reprocessed used oil in the USA



Used oil can be re-refined over and over again and is typically subject to the same stringent refining, compounding and performance standards as virgin oil. Wide application of this methodology enables us to extend natural resources and prevent negative ecological impacts.

Probably the most visible—and occasionally controversial—aspect of waste management in our industry is the question of what to do with our facilities once they have reached the end of their useful lives. Removal of offshore structures has posed a particular challenge. It is now widely accepted—and reflected in international standards—that the base case in decommissioning is removal. Consequently, in the past decade many small structures have been removed to shore, where much of the material (more than 90 per cent for some structures) has been re-used or recycled. Much larger structures, such as the steel and concrete Maureen platform in the North Sea, have also been re-floated and taken to land for recycling. Other decommissioned structures have been used to construct artificial reefs in coastal waters to enhance both fisheries and recreation.

On land, too, many industrial sites need rehabilitation. Our industry takes site remediation into account from a project's earliest planning stages, whether the location is a rain forest or an inner city site. In the past 10 years, the industry has developed new approaches to site remediation, many of which have been adopted by governments.

Actions speaking louder than words

Case studies on waste management

Letting the sun shine in

In 2000 the Abu Dhabi National Oil Company (ADNOC) completed two major gas projects: Asab Gas Gathering and Injection and the upstream part of the Onshore Gas Development Project.

For both, ADNOC's operating affiliate, Abu Dhabi Company for Onshore Oil Operations (ADCO) employed a novel method to eliminate the need for venting gas. This involved the use of solar panels to generate local power at the remote well sites. This power is then used to drive the chemical injection pumps as well as the

Solar panels generate local power at the remote well sites.

hydraulic pumps of the wellhead control panels. The need for pneumatic gas drivers was eliminated.

As a result of this switch, ADCO now avoids venting 9 million standard cubic feet of gas every day at its 142 well sites in the Asab and Bab fields. Not only does this do away with any safety risks associated with gas venting, it also reduces methane (CH_4) emissions by 17,000 tonnes per year—75 per cent of ADCO's annual CH_4 emissions. Life cycle savings costs are some $8 million.

Turning yellow into green

Sulphur extracted from oil products can either be put to practical use or emitted as air-borne waste in the form of sulphur dioxide (SO_2). At Statoil's Kalundborg refinery in Denmark, the company decided to make the most of some 275 tonnes of sulphur that remained every year despite the plant's advanced desulphurization facilities. Previously that sulphur had been released to the atmosphere in the form of 550 tonnes of SO_2.

Waste sulphur is now converted into agricultural fertilizer at Statoil's Kalundborg refinery in Denmark.

Instead, Statoil constructed a large new plant, costing some NOK 70 million, to produce agricultural fertilizer from the leftover sulphur. Completed in August 2001, the Kalundborg facility is the first of its kind, using a patent process to produce a liquid called ammonium thiosulphate (ATS)—a substance highly suitable for Danish farms. Annual output of ATS is expected to total 15–27,000 tonnes, depending on the types of crude and other feedstock used by the refinery.

The plant was developed, built and delivered by Haldor Topsoe A/S, which holds the patent on the process. Tie-in with existing installations was done by Statoil's own project team and the group owns and operates the facility as an integrated part of the refinery.

Refinery residue into clean power

A new gasification process developed by ChevronTexaco is turning a variety of carbon-based feedstocks—including high-sulphur, lower-value 'bottom-of-the-barrel' refinery residue—into a much cleaner synthesis gas known as 'syngas'. This gas, in turn, can be used to produce chemicals, cleaner motor fuels or even electricity.

This is what is happening in Italy, where three refineries are now operating syngas-fuelled power plants. Among them is the Energia plant in Falconara, in which ChevronTexaco has a 24 per cent equity stake. This gasification plant, at a refinery near the port of Ancona, converts tar residue from heavy oil into 280 megawatts of electrical power, which is then sold to Enel, the Italian state-owned electricity company.

Gasification plants like this may eventually be able to use refinery wastes to produce the hydrogen needed for the proliferation of automotive fuel cells.

The gasification process at the Falconara operation has allowed the refinery to reduce production of high-sulphur fuel oil, and it significantly reduces total refinery emissions of sulphur oxides, nitrogen oxides, particulates and carbon monoxide. As a result, the refinery has now reduced its emissions to a point below the limits set by European Union directives.

The ChevronTexaco gasification process is now being applied in similar, larger projects in France with partners TotalFinaElf and Electricité de France. An even larger plant is in preliminary development in Spain.

Eventually, these gasification plants could also use refinery wastes to produce the hydrogen needed for the proliferation of automotive fuel cells.

By reducing refinery emissions of sulphur oxides, nitrogen oxides, particulates and carbon monoxide, the gasification process can help refineries comply with limits set by European Union directives.

Water management

Background

Despite a global annual renewable volume of 41,000 cubic kilometres, freshwater is a scarce resource in many countries—particularly in its potable form. An estimated 1.1 billion people around the world lack access to safe water supplies.

Continuing population growth is likely to make this problem even more acute, with conflicting demands for limited local and regional supplies. The UN estimates that water used by people is likely to increase by 40 per cent in the next 20 years, with growing urban and industrial sectors consuming more of the water previously allocated to agriculture and ecosystems. Currently, eight per cent of the world's freshwater demand is for human health and sanitation purposes. Industry as a whole currently accounts for 20 per cent of all freshwater withdrawals, compared to agriculture, which accounts for nearly 70 per cent.

Though no quantitative estimates of the oil and gas industry's global use of freshwater are yet available, the total is likely to be a small proportion overall. However, in some parts of the world—desert areas in particular—our operations can be in conflict with the needs of other users.

Overall, there is a concern that a decline in water available for irrigation will reduce food self-sufficiency, push the world's total import needs beyond exportable supplies, and so create political and social instabilities in areas with food debits.

Given this background, it is hardly surprising that the politics of water management are changing. The topic is high on the agenda in many United Nations forums. Key frameworks being addressed by the oil and gas industry include water resources assessment, drinking water supply, and sanitation and water use efficiency.

Industry response

Our ability to find water comes naturally. This skill involves much the same disciplines as finding sub-surface deposits of oil and gas. Near-surface geological information that comes with our exploration for deeper hydrocarbon formations often provides knowledge about previously unknown and untapped groundwater sources.

Similarly, our experience in treating water to ensure its purity before being discharged to sea or injected into a reservoir gives us further opportunities to help local communities. In a number of cases, reed bed filters are used to naturally clean produced water, eliminating the need for additional processing technology. The resulting water can be used as a vital source of irrigation for local agriculture. In addition, produced water, if carefully managed, can be discharged to create environmentally important wetland habitats.

Refineries have taken a very comprehensive approach to water management. Water management includes water procurement and treatment for process use, and effective in-plant source control and housekeeping measures to recycle, reuse, treat and discharge. Measures such as utilizing recycle systems that use water more than once can greatly reduce the volume required. Process modifications, such as replacement of barometric condensers, have reduced water consumption and contamination. End of pipe treatment uses best-demonstrated technologies currently available to manage and minimize the impact of the discharges to the aquatic environment.

Actions speaking louder than words

Case studies on water management

Helping Yemeni neighbours find water

Nexen Inc. has been operating in the extremely arid Hadramaut region of Yemen since the early 1990s. During that time they have enjoyed dual success in drilling for hydrocarbons for their shareholders and finding water for the surrounding communities.

Nexen is supplying funding and water management expertise to communities in the arid Hadramaut region of Yemen.

Participants in the programme contribute what they can to the projects—often in the form of labour or locally available building materials. This ensures that they have a stake in making the projects sustainable over the long-term.

Nexen's contribution to the community has taken a variety of forms. In addition to supplying the necessary geophysical data and $2 million in funding, the company has transferred valuable technical expertise to Yemen's national water resource management agencies. Plans are being developed to extend this knowledge as the basis for a larger scale community water programme in Yemen under the auspices of the UN Global Compact.

More than 20 villages have benefited from assistance with the drilling of new water wells and the supply of pumps, generators, reservoirs and distribution systems to gain maximum advantage from large supplies of potable groundwater undiscovered before Nexen came onto the scene.

A green boost for the Caspian

Water samples turned green by single-celled algae will help researchers at the first environmental laboratory in Azerbaijan equipped to international standards determine how oil field discharges affect the inland sea's environment.

Established at the initiative of the Azerbaijan International Operating Company (AIOC), the lab is run by Kvaerner subsidiary Environment and Resource Technology (ERT). ERT, in turn, is working closely with local scientists as well as experts from abroad. Together they are helping to put Azerbaijan on a higher plane in the world of ecological science.

One of the lab's first projects has been analysis of seabed samples from the Shah Deniz exploration area. The studies show that molluscs, insects, crustaceans, worms and larvae live in Caspian waters as deep as 700 metres. If oil discoveries are made and developed in Shah Deniz, such information will be vital in determining how operations are affecting the marine environment.

Other jobs for the lab include environmental impact assessments for oil companies as well as the Azeri authorities, studying the effects of oil industry discharges on the marine environment and planning carefully controlled waste disposal. The ERT lab in Azerbaijan is planned as the first of several in the Caspian states.

According with desert priorities

In the desert of south-eastern New Mexico, ground water is a far more precious substance than natural gas. In recognition of this fact, Marathon Oil Corporation is helping to conserve fresh groundwater supplies by means of innovative treatment technology

Water management

employed in the Indian Basin Field. There, entrained hydrogen sulphide gas is removed from water that is produced in conjunction with natural gas. Marathon can then use some of this produced water—rather than ground water—in drilling operations.

In the days before this treatment technique, Marathon had re-injected all produced water into a non-producing formation for disposal. During 2000, the water treatment system reduced Marathon's fresh groundwater use in the Indian Basin Field by about 4 million gallons. Thanks to this water conservation effort, the company is helping to ensure that fresh groundwater is available for residential, agricultural and other purposes in the area—now and in the future.

Marathon's water treatment system is helping to make fresh groundwater available for communities in southeastern New Mexico.

Striking water in Angola

Oil exploration and production are not Norsk Hydro's only activities in Angola. The company is also finding and producing water to irrigate a potentially highly fertile—but heretofore arid area south of Luanda.

Using old exploration data, Norsk Hydro found that there was an aquifer reserve about 200 metres below the surface. Based on that information, the company began drilling five wells for local villages. In a country where one cubic metre of water can cost US$7, these wells are already making a huge difference to farmers. The wells can produce 200,000 litres a day—enough for 6000 people and ample supplies for 350 farms of half a hectare each.

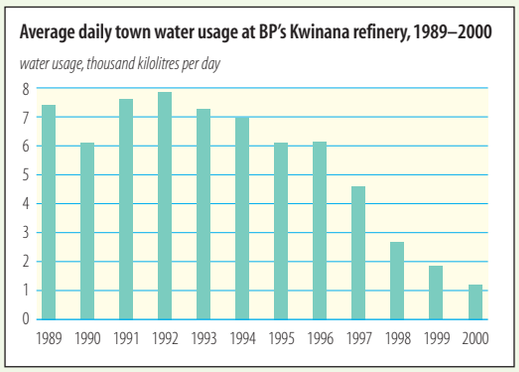
Once all the wells are drilled, Norsk Hydro intends to teach local farmers how to utilize more modern agricultural techniques, such as drip irrigation and new seed varieties. This would enable the farmers to help meet the growing demand for vegetables by Luanda's expanding population.

A series of wells in Luanda provides the local communities with ample supplies of fresh water.

Less is more at Kwinana

BP's Kwinana refinery in Western Australia started a water reuse and minimization programme in 1997. Its objectives were to use less water, maximize water reuse in refinery processes and, whenever possible, use low quality water (such as groundwater) instead of potable water.

A holistic approach to water management ensured the targeting of all areas within the refinery. Results were impressive. There was a significant decrease in total water use. Another tangible environmental benefit included a reduction in contaminant loads in the refinery's marine discharge due to decreased flows (by 26 per cent) to the wastewater



Average daily water use has decreased dramatically at the Kwinana refinery since the early 1990s.

Water management

treatment plant. There was a financial reward as well: a saving of AUD$0.9 million per year.

Most important of all however, was the 70 per cent decrease in potable water use at Kwinana. A year before the programme began, the refinery was Western Australia's biggest consumer of potable water. Now that water is being put to much better use to satisfy the growing demands of the community in an arid region subject to summer restrictions on water consumption. Not surprisingly, BP's local and regional reputation has been enhanced by the success of the programme.

BP's Kwinana refinery in Western Australia

Annex 1

Examples of oil and gas industry achievements according to Agenda 21 chapters

Agenda 21 chapter number	Examples of industry achievement
Section 1—preamble	
Chapter 1: *Social and Economic Dimensions*	• IPIECA/OGP approach to sustainable development including continued diligence and attention to balanced and integrated approaches to development
Chapter 2: *International Cooperation*	• IPIECA/IMO Global Initiative for oil spill contingency planning and response—Cooperation between countries within the Global Initiative (GI) programme • UNEP-World Conservation Monitoring Centre (UNEP-WCMC) Biodiversity Map Library • A number of companies have signed the UN Global Compact
Chapter 3: *Combating Poverty*	• Employment • Providing access to energy • Capacity building and technology cooperation • Local business development • Local population benefiting from industry activities • Investment of multinational corporations (MNCs) • Training local staff, local contractor base etc.
Chapter 4: *Changing Consumption Patterns*	• Increased production of natural gas and investment in infrastructure for its distribution • Development of new technologies such as fuel cells and solar power • Energy efficiency • Cleaner production • Wealth creation
Chapter 5: *Demographic Dynamics and Sustainability*	• An area not consistently addressed in the past. Industry is remedying that through social impact assessment. • HIV/AIDS awareness and prevention programmes
Chapter 6: *Protection and Promotion of Human Health*	• Reduction of toxic emissions and discharges from facilities • Community health care at remote exploration and production (E&P) facilities • Improvement in workers' health indicators • HIV/AIDS awareness and prevention programmes • Reduction/phase out of lead from gasoline • Lower levels of benzene and sulphur in gasoline • OGP strategic health management initiative

Annex 1: Examples of oil and gas industry achievements according to Agenda 21 chapters

Chapter 7: *Promoting Sustainable Human Settlement Development*	• Initiatives at remote communities ('needs assessment' of local communities). • Provision of health care and potable water and proposed schemes such as micro-credit for women and women's education • Development of social and environmental impact assessment guidelines • See also Chapter 5
Chapter 8: *Integrating Environment and Development in Decision Making*	• Improved health, safety and environment management systems (HSE-EMS) and other management systems • ISO 14000 and company environmental policies • Increased commitment to sustainable development through integrating/balancing economics/environment and social issues in the decision-making process
Section II **Conservation and management of resources for development**	
Chapter 9: *Protection of the Atmosphere*	• Reduction of toxic emissions from facilities • Supporting air quality management programmes—IPIECA *Toolkit* • Improvement of fuel specifications • Reduced chlorofluorocarbons (CFC) and minimizing use of halon gas • Flare and vent reduction and elimination programmes to reduce GHG emission • Active participation in climate change debate and delivery of real reductions in GHG • Reduction of carbon dioxide (CO_2) emissions through more effective power generation and process optimization to reduce energy needs; increased energy efficiency • Implementation of technologies to reduce nitrogen oxide (NO_x) emissions
Chapter 10: *Integrated Approach to the Planning and Management of Land Resources*	• Improved operations in sensitive areas • Consultation with and integration of local communities via Environmental and Social Impact Assessment (ESIA)/needs assessment • Interactive Map Service (IMapS)/sensitivity mapping
Chapter 11: *Combating Deforestation*	• Improved operations in sensitive areas ('offshore small footprint approach') • Reforestation/aforestation projects • Introduction of butane and natural gas as household fuel to replace the use of wood
Chapter 12: *Combating Desertification and Drought*	• Improved operations in sensitive areas ('offshore approach') • Reforestation/aforestation projects • Enhanced awareness of biodiversity • Introduction of butane and natural gas as household fuel to replace the use of wood • Enhanced focus on responsible water management
Chapter 13: *Sustainable Mountain Development*	• Efforts to reduce the environmental footprint in mountainous areas (low-impact/heli-portable seismic and drilling operations) • Road-less development
Chapter 14: *Promoting Sustainable Agriculture and Rural Development*	• Social investment programmes • Additional roads linking local villages and enabling easier access to fields and other areas • See also Chapter 7

Annex 1: Examples of oil and gas industry achievements according to Agenda 21 chapters

Chapter 15: *Conservation of Biological Diversity*	• Interactive Map Service (IMapS) • Improved operations in sensitive areas • Baseline and biodiversity conservation studies and programmes • Sensitivity mapping in general • Linkage of biodiversity through EMS • Production of guidelines for operating in sensitive areas • Rig to reef programme • Engagement and implementation of conservation programmes worldwide for species of plants, animals and habitats.
Chapter 16: *Environmentally Sound Management of Biotechnology*	• Bioremediation of spilled oil • Treatment of produced water • Bioremediation of cuttings • Reed bed technology
Chapter 17: *Protection of the Oceans*	• Reduction of oil in water from effluents (sewage, produced water, drilling muds) • Re-injection of produced water in selected areas • Improvement of oil spill contingency planning and response capabilities • Spill prevention initiatives • Sponsorship and research into aspects related to oceans • Support for voluntary estuary action plans • Capacity building and technology transfer • Rigs to reefs programme • Offshore small footprint approach • Improvement of coastal human settlements • Cooperation and promotion of coastal systemic observations—impact on coast • Consultation on coastal and marine issues with local administrators, resource users and general public • Conservation and restoration of altered critical habitats • Facilitate public education, awareness and information programmes • See also Chapter 15
Chapter 18: *Protection of the Quality and Supply of Freshwater Resources*	• Scrapping of old underground storage tanks and groundwater reclamation • Use of properly designed landfills • Drilling water bores for communities • Pipeline routing and protection • Protection of potable aquifers • Measures to protect surface water quality eg tunnelling of pipeline stream crossings vs. trenching • Development of downhole separation technology for oil and water • Capacity building
Chapter 19: *Environmentally Sound Management of Toxic Chemicals*	• Improved HSE-MS • Research on health effects of high volume chemicals • Requirement for completed material safety data sheet (MSDS) and cradle-to-grave procedures • Hazardous and Noxious Substances (HNS) Convention and industry support • Responsible care initiative of petrochemical industry • See also Chapter 16
Chapter 20: *Environmentally Sound Management of Toxic Wastes*	• Improved HSE-MS • Reduction of oil based drilling muds (OBM) usage • Availability of infrastructure capable of handling toxic waste • Recycling lubricating oil • Improved waste disposal and management plans within companies • Disciplined waste minimization programmes • Encouragement to public to review comprehensive information sources such as waste characterization studies involving restoration • See also Chapter 16

Annex 1: Examples of oil and gas industry achievements according to Agenda 21 chapters

Chapter 21: *Environmentally Sound Management of Solid Wastes and Sewage*	• Improved HSE-MS • Reduction of oil in water from effluents (sewage, produced water, drilling muds) • Adequate infrastructure and procedures • Waste management and recycling initiatives
Chapter 22: *Safe and Environmentally Sound Management of Radioactive Wastes*	• NORM (Naturally Occurring Radioactive Materials) management—and development, as necessary, of infrastructure to international guidelines (as for wastes)
Section III **Strengthening the role of major groups**	
Chapter 23: *Preamble to Section III*	N/A
Chapter 24: *Global Action for Women Towards Sustainable and Equitable Development*	• Promotion of diversity in staff and equal rights for staff (employment policies) • Employment equity programmes in many companies • Providing jobs for women in local areas in refineries or other industry facilities/equal employment rights for women • Maternity leave and medical benefits • See also Chapter 7
Chapter 25: *Children and Youth in Sustainable Development*	• Support of educational programmes in schools (children) • Community programmes (young adults and other) • Commitments not to use child labour • See also Chapter 7
Chapter 26: *Recognizing and Strengthening the Role of Indigenous People and their Communities*	• Social responsibility • Tripartite dialogue (indigenous people, government, industry)—regulatory framework • Consultation and ESIA • Joint venture partnerships with aboriginals in support businesses • See also Chapter 7
Chapter 27: *Strengthening the Role of NGOs: Partners for Sustainable Development*	• Joint publication of environmental guidelines and standards • NGO/stakeholder consultation for new projects as part of ESIA • Consultation • Use of NGOs as intermediaries for delivery of some community outreach projects
Chapter 28: *Local Authorities' Initiatives in Support of Agenda 21*	• Some companies work with local authorities to support and add to their initiative • Work with many local, regional and national governments and regulators toward development of meaningful, responsible and effective regulatory instruments • Capacity building and infrastructure improvement
Chapter 29: *Strengthening the Role of Workers and their Trade Unions*	• Development of codes of conduct • Improved HSE-MS
Chapter 30: *Strengthening the Role of Business and Industry*	• Improved HSE-MS • Environmental, health, safety and sustainability reporting • Research and development • Technology transfer of Multi-National Corporations (MNCs) and with the support of associations • Industry organizations and consultation bodies with government • Increased communication and cooperation with local governments

Annex 1: Examples of oil and gas industry achievements according to Agenda 21 chapters

Chapter 31: *Scientific and Technological Community*	• Research and Development (R&D) projects • Scientific capacity building in many emerging economies through training and financial support for R&D
Chapter 32: *Strengthening the Role of Farmers*	• Methanol fuels; sulphur as fertilizer waste process heat utilization projects to assist greenhouse and fish farming projects • Providing fuel for agricultural operations
Section IV Means of Implementation	
Chapter 33: *Financial Resources and Mechanisms*	• Wealth generation including revenues for reinvestment within other sectors of host economies
Chapter 34: *Transfer of Environmentally Sound Technology, Cooperation and Capacity Building*	• Technology transfer of MNCs and with the support of associations • Exchange of HSE policies and training with partners/suppliers/contractors • Investment itself and employment of local staff and contractors leads to transfer in itself • Clean Development Mechanisms projects • IPIECA Global Initiative (GI) Programme
Chapter 35: *Science for Sustainable Development*	• R&D projects • Technological breakthroughs
Chapter 36: *Promoting Education, Public Awareness and Training*	• Support and development of educational and training events • IMO/industry seminars • Producing scientifically sound and up to date reports on environmental, health, safety and sustainability issues.
Chapter 37: *National Mechanisms and International Cooperation for Capacity Building*	• Supporting air quality management programmes • Fostering Environmental Impact Assessment (EIA) • Global Initiative—IMO/industry seminars • Global Compact • Running capacity building seminars and workshops
Chapter 38: *International Institutional Arrangements*	• Input to the Climate Change process • Participation in World Summit on Sustainable Development (WSSD)
Chapter 39: *International Legal Instruments and Mechanisms*	• Technical and scientific input to UN bodies—Observer status • Global Compact
Chapter 40: *Information for Decision Making*	• Extensive use/experience of EIAs, briefing papers to stakeholders • Consultation • Interactive Map Service (IMapS) • Supporting air quality management programmes—IPIECA *Toolkit* • Enhanced use of records of decision for restoration projects • Education of public on availability and accessibility of information

Annex 2

Publications and workshops

IPIECA publications and workshops

2002 *Managing HIV/AIDS—Knowledge, Policy & Action: Oil & Gas industry Case Studies*

2002 *Long-Term Carbon and Energy Management: Issues and Approaches, an IPIECA Symposium*

2002 IMO/IPIECA regional workshop on Oil Spill Preparedness, Response and Cooperation for Eastern Africa, Mauritius (May 2002)

2001 *Dispersants and their Role in Oil Spill Response* (2nd edition)

2001 *The IPIECA Urban Air Quality Management Approach—The IPIECA Toolkit*

2001 *The Preparation and Application of Pollutant Emission Inventories: Exploring The Capacity of the IPIECA Toolkit*

2001 *Climate Change a Glossary of Terms* (3rd edition)

2000 *Workshop Summary—Practical Application of the Kyoto Mechanisms: Opportunities and Issues*

2000 *Opportunities, Issues and Barriers to the Practical Application of the Kyoto Mechanisms, Final Report*

2000 *Contingency Planning for Oil Spills on Water* (2nd edition)

2000 *Choosing Spill Response Options to Minimize Damage, (NEBA)*

2000 *Oil Spill Compensation: A Guide to the International Conventions on Liability and Compensation for Oil Pollution Damage*

2000 *Biodiversity and the Petroleum Industry: A Guide to the Biodiversity Negotiations*

2000 *Corporate Responsibility, Summary of an IPIECA Workshop*

2000 IMO/IPIECA regional workshop on Oil Spill Preparedness, Response and Cooperation for the wider Caribbean, Curaçao

2000 IMO/IPIECA regional workshop on Oil Spill Preparedness, Response and Cooperation for West and Central Africa, Luanda, Angola

1999 *Biological Impacts of Oil Pollution: Sedimentary Shores*

1999 *The Use of International Oil Industry Spill Response Resources: Three Tier Centres*

1999 *IMO/IPIECA CD ROM: Working Together—Effective Oil Spill Contingency Planning Process*

1999 *Buenos Aires and Beyond: A Guide to the Climate Change Negotiations*

1999 *Technology Assessment in Climate Change Mitigation: Report of the IPIECA Workshop*

1999 *Technology Cooperation/ Technology Assessment* Summary Booklet

1997 *The Oil Industry: Operating in Sensitive Environments* IPIECA/E&P Forum Publication

1997 *Biological Impacts of Oil Pollution: Fish and Fisheries*

1997 *An Approach to the Management of Urban Air Quality: Local Needs, Local Solutions*

1996 *Symposium on the Critical Issues in the Economics of Climate Change*

1996 *Long-Range Scenarios for Climate Change Policy Analysis*

1996 *The Oil Industry Experience: Technology Cooperation and Capacity Building Contribution to Agenda 21* UNEP/IPIECA Publication

1996 *Sensitivity Mapping for Oil Spill Response*

1996 *Guide to Oil Spill Exercise Planning*

1996 IMO/IPIECA seminar on Contingency Planning for Oil Spill Response for the African region, Cape Town, South Africa

1995 *Biological Impacts of Oil Pollution: Rocky Shores*

1994 *Biological Impacts of Oil Pollution: Saltmarshes*

1994 *Experts' Workshop on Critical Issues in the Science Of Global Climate Change, Woods Hole*

1994 IMO/IPIECA seminar on Contingency Planning for Oil Spill Response for the island states and territories of the Caribbean, Curaçao

Annex 2: Publications and workshops

1994 IMO/IPIECA seminar on Contingency Planning for Oil Spill Response for East Asia and Pacific countries, Hong Kong

1993 Experts' Workshop on *Socio-Economic Assessment of Climate Change*, Lisbon

1993 *Biological Impacts of Oil Pollution: Mangroves*

1993 IMO/IPIECA seminar on Contingency Planning for Oil Spill Response for the African coastal states and those bordering the Great African Lakes, Libreville, Gabon

1993 IMO/IPIECA seminar on Contingency Planning for Oil Spill Response for the ROPME Sea Areas, Manama, Bahrain

1992 *Biological Impacts of Oil Pollution: Coral Reefs*

1992 IMO/IPIECA seminar on Contingency Planning for Oil Spill Response for the Mediterranean Region, Cairo, Egypt

1992 IMO/IPIECA seminar on Contingency Planning for Latin and Central America, Caracas, Venezuela

1992 *Global Climate Change: A Petroleum Industry Perspective,* Rome

1991 *Climate Change and Energy Efficiency in Industry* UNEP/IPIECA Report

1990 *Biological Impacts of Oil Pollution*

OGP publications and workshops

2002 *Aromatics in produced water: occurrence, fate and effects, and treatment*

2001 *Firearms and the use of force*

2001 *Safety performance of the global E&P industry 2000*

2001 *HSE aspects in a contracting environment for geophysical operations (schedules and plans)*

2001 *Guidelines for the control of HIV and Hepatitis B + C in the workplace*

2000 Workshop: *The future of decommissioning*

2000 *Strategic health management: principles and guidelines*

2000 *Substance abuse: guidelines for management*

2000 *Safety performance of the global E&P industry 1999*

2000 *Flaring and venting in the oil and gas exploration and production industry*

2000 *Guidelines for produced water injection*

1999 *HSE Management—Guidelines for working together in a contract environment*

1999 *Safety performance of the global E&P industry, 1998*

1999 *HSE competence assessment and training guidelines for the geophysical industry*

1999 *Health performance indicators*

1999 *Human factors and behavioural issues applicable to safety performance seminar*

1998 *E&P industry safety performance accident data, 1997*

1998 *Health aspects of work in extreme climates within the E&P industry—the heat*

1998 *E&P industry safety performance accident data, 1995* (revised)

1998 *Health aspects of work in extreme climates within the E&P industry—the cold*

1997 *Sustainable development and the oil and gas industry: position paper*

1997 *Principles for impact assessment: the environmental and social dimension*

1997 *Bridging document for E&P Forum HSE MS—EMAS*

1997 *Quantitative performance measures of HSE management system effectiveness*

1997 *The oil industry operating in sensitive environments—joint IPIECA/E&P Forum document*

1997 *Environmental management in oil and gas exploration and production*

1996 *Guidelines for the control of blood borne pathogens*

1996 *Technologies for handling produced water in the offshore environment*

1996 *Guidelines for HSE auditing in the geophysical industry*

1996 *The physical and biological effects of processed oily drill cuttings*

1995 *Health assessment of fitness to work in the E&P industry*

1995 *Health safety and environmental schedules for land geophysical operations*

1994 *Methods for estimating atmospheric emissions from E&P operations*

1994 *Accident data 1993*

1994 *Guidelines for the development and application of health, safety and environmental management systems*

Annex 2: Publications and workshops

1994	*Production water treatment: current and emerging technologies*
1994	*North Sea produced water: fate and effects in the marine environment*
1993	*Oil and gas exploration and production in arctic and subarctic onshore regions—guidelines for environmental protection*
1993	*Oil and gas exploration and production operations in mangrove areas—guidelines for environmental protection*
1993	*Guidelines for the planning of downhole injection programmes for oil based mud wastes and associated cuttings from offshore wells*
1993	*Exploration and production waste management guidelines*
1993	*Accident data 1992*
1993	*Health management guidelines for remote land-based geophysical operations*

Achievements

- Increased supplies of safer, cleaner, economically viable and more reliable fuels for transport, light, power and heat.
- Implemented management systems that have significantly improved safety, health and environmental performance and which provide an ongoing pathway to continuous improvement.
- Innovated and deployed advanced technologies that increased the size of viable recoverable resources, improved product quality, and enhanced both environmental and end-use performance.
- Contributed to countries' efforts to develop their natural resources and improve their own communications, transport, health and education systems through technology cooperation and capacity building.

Unfinished business

- Developing and investing in advanced technology to meet growing demand for affordable energy products while improving security of supply and reducing environmental impacts.
- Enhancing our contribution to sustainable development through a greater integration of economic, environmental and social dimensions.
- Conducting our operations with better understanding (by all) of our roles and responsibilities and finding ways to work efficiently, in consultation with others, to improve decision-making processes that relate to our industry.

Future challenges

- To ensure the continuous availability of affordable, secure, environmentally sound and socially acceptable energy products and services for a growing world population.
- To improve the social dimension of our business in order to broaden the benefits of wealth creation and thereby contribute to the alleviation of poverty.
- To demonstrate a balance in consideration of security of supply, environmental, economic and social issues in meeting growing energy demand.

The International Petroleum Industry Environmental Conservation Association (IPIECA) is comprised of oil and gas companies and associations from around the world. Founded in 1974 following the establishment of the United Nations Environment Programme (UNEP), IPIECA provides the oil and gas industry's principal channel of communication with the United Nations.
IPIECA is the single global association representing the industry on key environmental issues including oil spill preparedness and response; global climate change; operational issues; and biodiversity.

Through a Strategic Issues Assessment Forum, IPIECA also helps its members identify new global environmental issues and evaluates their potential impact on the oil and gas industry. IPIECA's programme takes full account of international developments in these global issues, serving as a forum for discussion and cooperation involving industry and international organizations.

International Association of Oil & Gas Producers

OGP represents the upstream oil and gas industry before international organizations including the International Maritime Organization, the United Nations Environment Programme (UNEP) Regional Seas Conventions and other groups under the UN umbrella. At the regional level, OGP is the industry representative to the European Commission and Parliament and the OSPAR Commission for the North East Atlantic. Equally important is OGP's role in promulgating best practices, particularly in the areas of health, safety, the environment and social responsibility.

International
Association
of Oil & Gas
Producers

IPIECA

International Petroleum Industry
Environmental Conservation Association