



# International oil movements



**sls**

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# The flow of world oil

Oil is the largest single commodity in world trade. One and a half billion tonnes of crude oil and petroleum products cross national frontiers each year, most of it over the oceans.

By weight, oil trade is far larger than iron ore, or grain, or coal – even the three taken together. Although volumes have fallen by 25 per cent over the last ten years, oil trade today is nearly as large as the combined total of all 'other' items (raw materials, semi-manufactures and finished goods) shipped internationally (Figure 1).

Despite the extent of the world oil trade, much of the 60 million barrels of oil used worldwide each day is consumed in the country of origin.

The two largest producers are also the world's largest consumers. The Soviet Union uses four-fifths of its production of 12.6 million barrels a day (b/d). The United States consumes all it produces – 10 million b/d – and is also the world's largest importer.

The United States, Western Europe and Japan together draw heavily on supplies from abroad. Their import needs, added to those of all other regions, amount in total to 26 million b/d.

## Development of oil movements

The history of international oil movements had already begun at the start of the 20th Century. Oil, no longer in demand primarily for illumination, was also wanted as a source of power. The growth of American production had outstripped domestic demand and outlets were being sought abroad.

By this time the Nobel brothers had introduced the first modern pipelines and tankers to move crude oil and refined products from the Caucasus into Western Europe, but it was Marcus Samuel, founder of Shell, who conceived the idea of shipping oil by

tanker through the Suez Canal. This provided access to the markets of the Far East, spreading competition and giving oil movements a truly international character.

Today the oil supply network links every continent, seen in Figure 2. This shows, as might be expected, that the predominant share of exports from one region to others is held by the Middle East. This volume is two and a half times that from the whole of Africa, the next largest exporting region, and three times as large as that from either the Communist Countries or Central and South America.

The only other significant exporter is North West Europe. The other regions listed in Figure 2 all contribute to international oil movements, but each does so at a level below 1 million b/d.

The exports go principally to Europe, the United States and the Far East. These absorb the lion's share of

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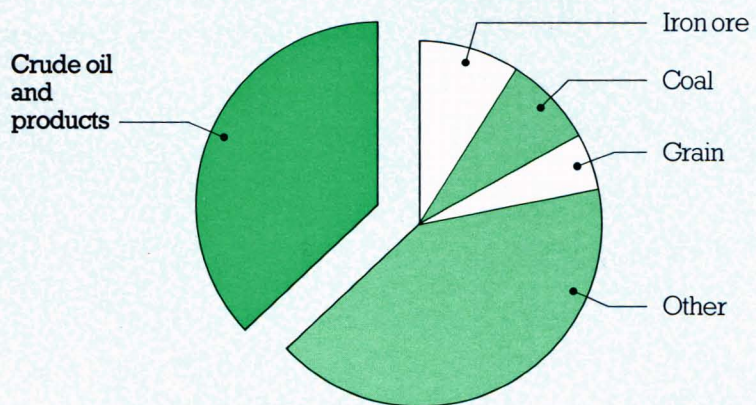
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Figure 1

## World seaborne trade, 1987



Total: 3418 million tonnes

Source: *Fearnley's Review*



Figure 2

**Crude oil and product movements, 1987**

Excluding intra-regional movements. Thousand barrels a day.

| Importers                 | Exporters                |                           |                   |                      |              |             |                      |            |             |            | Total        |
|---------------------------|--------------------------|---------------------------|-------------------|----------------------|--------------|-------------|----------------------|------------|-------------|------------|--------------|
|                           | United States and Canada | Central and South America | North West Europe | Mediterranean Europe | Middle East  | Africa      | Indian Sub-Continent | Far East   | Communist   | Unknown    |              |
| United States and Canada  | 0                        | 2320                      | 770               | 140                  | 1190         | 1250        | 30                   | 410        | 150         | 50         | 6310         |
| Central and South America | 150                      | 0                         | 10                | 0                    | 650          | 150         | 0                    | 0          | 340         | 0          | 1300         |
| North West Europe         | 80                       | 280                       | 0                 | 310                  | 1190         | 990         | 0                    | 0          | 1090        | 210        | 4150         |
| Mediterranean Europe      | 60                       | 410                       | 730               | 0                    | 2480         | 1620        | 0                    | 0          | 960         | 170        | 6430         |
| Middle East               | 0                        | 40                        | 20                | 10                   | 0            | 70          | 0                    | 130        | 60          | 0          | 330          |
| Africa                    | 0                        | 0                         | 0                 | 0                    | 430          | 0           | 0                    | 50         | 130         | 0          | 610          |
| Indian Sub-Continent      | 0                        | 90                        | 40                | 60                   | 260          | 30          | 0                    | 20         | 40          | 80         | 620          |
| Far East                  | 130                      | 240                       | 10                | 20                   | 4270         | 90          | 20                   | 0          | 460         | 200        | 5440         |
| Communist                 | 0                        | 0                         | 0                 | 10                   | 250          | 120         | 0                    | 30         | 0           | 0          | 410          |
| Unknown                   | 0                        | 0                         | 90                | 70                   | 40           | 0           | 0                    | 40         | 0           | 0          | 240          |
| <b>Total</b>              | <b>420</b>               | <b>3380</b>               | <b>1670</b>       | <b>620</b>           | <b>10760</b> | <b>4320</b> | <b>50</b>            | <b>680</b> | <b>3230</b> | <b>710</b> | <b>25840</b> |

Central and South America = Central/Caribbean and South America, Mexico, Puerto Rico and Virgin Islands.  
 North West Europe = Sweden, Germany, Switzerland, Finland, Ireland, Belgium, Greenland, Iceland and North Sea.  
 Mediterranean Europe = Austria, France, Spain, Portugal, Yugoslavia, Italy, Greece, Turkey, Malta and Cyprus.  
 Middle East = Gulf Countries and Syria, Israel, Lebanon, Iraq East Mediterranean and Iraq Red Sea.  
 Indian Sub-Continent = Afghanistan, Pakistan, India, Bangladesh, Sri Lanka and Burma.  
 Communist = Centrally Planned Economies (not including Yugoslavia or Cuba).

international oil, as the Figure shows. Central and South America is also a significant importer, but at a much lower level.

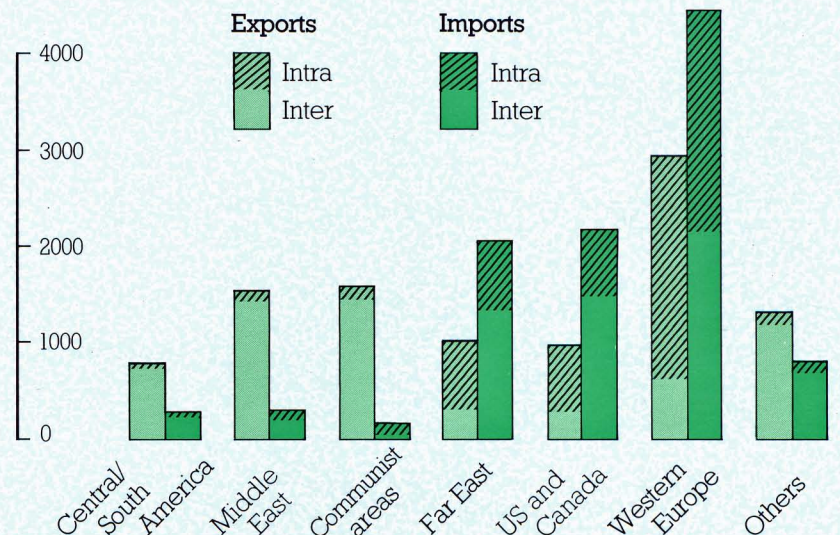
However, the Figure underlines that the picture is more complicated than might at first sight appear. USA/Canada, for example, although importing 6.3 million b/d in 1987, also exported 420 000 b/d, mainly to Central and South America and the Far East. And the Middle East, the world's largest exporter, imports 330 000 b/d.

Many of these apparent anomalies are due to the movement of oil products. Product flows between major areas in 1987 amounted to just over 6 million b/d. In addition, some 4 million b/d of products flowed within those areas. Of the total, middle distillates account for the largest share (32 per cent), followed by gasolines (24 per cent) and fuel oil (20.5 per cent). The main regional product movements are shown in Figure 3.

Figure 3

**World oil product movements, 1987**

Thousand barrels a day





## ■ Patterns of trade

The markets to which oil is moving are constantly evolving, both in size and quality, but the events of 1973 changed the structure of the industry that supplied them and the patterns of trade that had formed over the years.

The traditional system had given to oil over three generations a stability not equalled in other commodities. In this way, the bulk of international supply had been made secure through the integrated operations of oil companies, with their own resources to search for, produce, refine and market oil. It had grown naturally out of the need to tackle and solve interrelated problems of diversification of markets, technology and sources of new oil.

Success in providing long-term guarantees of 'cheap oil from safe areas' also rendered those integrated operations more vulnerable to challenge by non-integrated operators and by the new wave of economic nationalism in the world community of states.

With markets booming and dependence on oil by industrial

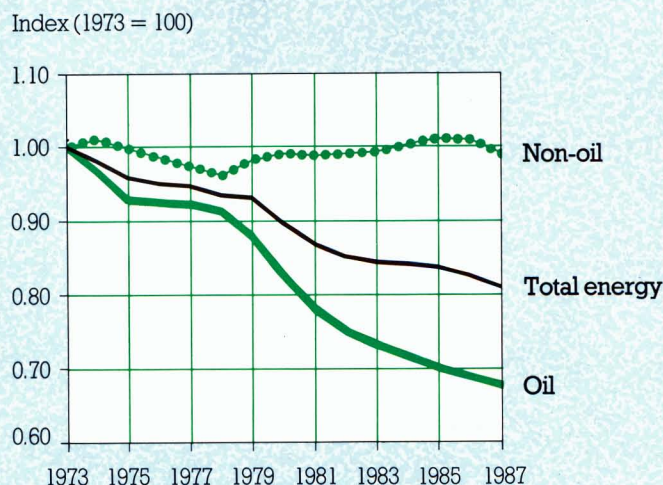
countries rising, governments of countries in which oil was located, acting together, were by 1973 able to impose their own terms on consumer nations. This unity among oil-producing countries quadrupled the price of oil in a year.

### ■ Developments post-1973

Disunity and political unrest were – initially – going to do even more. In the mid-1970s Iran contributed 10 per cent of world oil supplies and an even higher percentage of exports. As civil disturbances mounted towards the end of the decade, the figure plummeted to 2 per cent. The cut in world supplies and the uncertain outlook sent spot prices to over \$40/barrel, and the marker crude price reached its peak of \$34 in November 1981.

The consequences of the consumer reaction against the wave of price-rises were soon felt. Oil intensities, which had steadied after the initial reactions to the events of 1973, began a prolonged fall (Figure 4). High oil prices, coupled with importing

Figure 4 Oil and energy intensities\*

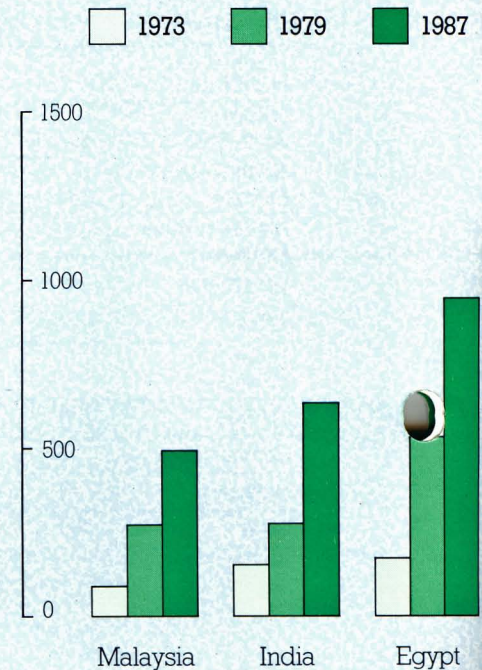


\*Demand per unit of GNP. World outside Communist areas

Figure 5

### Non-OPEC oil production (selected countries)

Thousand barrels a day

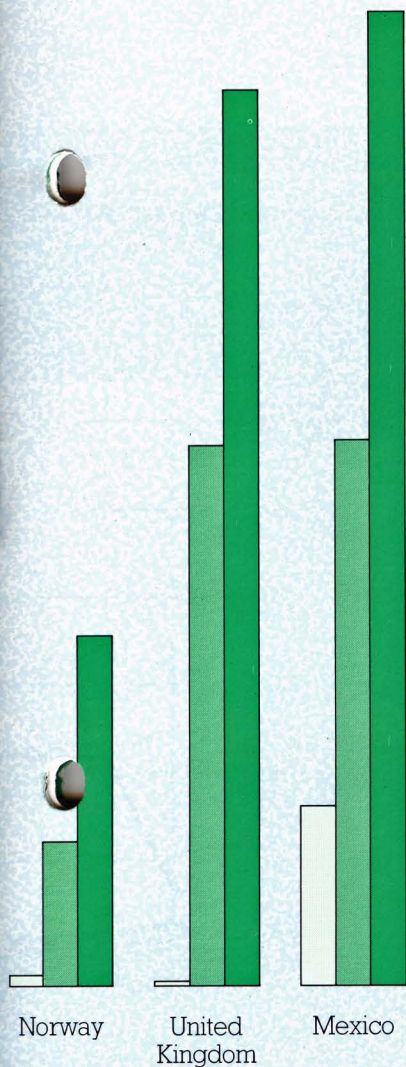


governments' desires for reduced dependence on oil imports, spurred exploration and production in non-OPEC countries (Figure 5). As governments acted also to stem the drain on their finances and to fight inflation, world recession set in.

The oil-producing countries, where the escalation of oil revenues had created new expectations, were forced to reduce output, and oil prices weakened. Between 1980 and 1985, the combination of lower prices and falling demand cut the total revenues of the oil producers by half.

To combat the effect of falling prices, they strove to sell more by abandoning their agreed production ceilings, entering the market in force, selling direct to consumer governments and spot-trading in competition. The effect was to trigger the oil price collapse of 1986, and to cut OPEC revenues by a further 50 per cent. At its bottoming-out price of \$8 a





on the margin of international trade, but now it became an important element, even arguably deciding its direction.

Completely new, however, was another phenomenon – a paper market, where sales of oil could be brisk and made by agents without physical trade of their own.

### ■ Growing uncertainty

In the mid-1980s, with supplies exceeding demand and new non-OPEC producers coming into the market, price uncertainties increased. The risks in trading also increased. This led to the growth of forward and future markets for oil similar to those existing for other commodities. Oil trading was thus opened to new players, notably investment banks, with experience and know-how in commodity trading and dealing with many markets. Checks and balances were sought as a safeguard against volatility.

For the future, volatility is one of the few certainties envisaged by market-

watchers. Another is that, whatever the temporary difficulties, the major OPEC countries will remain important actors in the oil scene.

The current proven reserves of OPEC countries (Figure 6) are some 670 billion barrels, equivalent to 95 years' production, or over 80 per cent of the more than 800 billion barrels of proven reserves outside the centrally-planned economies.

Although more than 50 non-Communist countries outside OPEC produce around 26 million b/d, 75 per cent is consumed on the spot, leaving only about 7 million b/d to enter international trade.

Last year OPEC produced about 30 per cent of the world's oil - a drop of 16 per cent since 1979, but still representing over 70 per cent of international oil.

Moreover, most OPEC oil is easy to produce and has a relatively low technical cost. Inevitably, the time will come when oil-consumers will have to turn again to those countries for an increasing part of their needs.

barrel, oil came to be sold, in real value terms, at somewhere near the pre-crisis level of 1973.

Patterns of trade were thereafter to be determined by four main developments, separate but related; their interaction had a bearing on prices, and thus on the amount of oil available in trade.

The first was the expansion of direct sales to importing governments by oil-exporting countries. This diminished the role of intermediaries, principally the larger integrated oil companies.

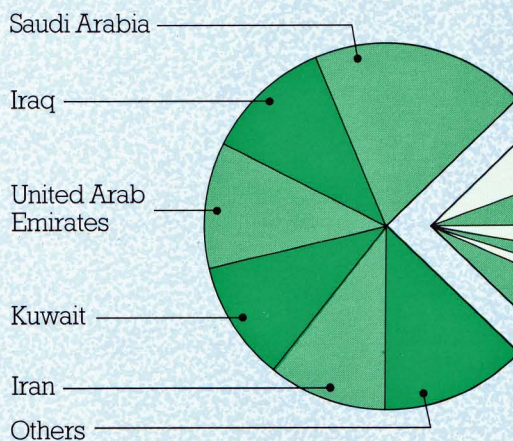
Secondly, although there began to emerge a long-term contract market influenced by the official OPEC price, it was no longer the stabilizer. In scale it was greatly reduced, and it covered a part of all trading.

Alongside, the short-term single-cargo market proliferated, dominated by small producers and traders. A small spot-market had always existed

Figure 6

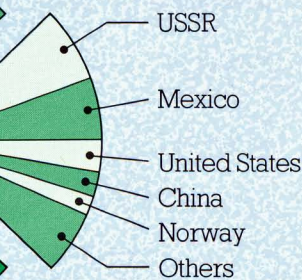
### Current proven reserves

#### OPEC



Total: 670.7 billion barrels

#### Non-OPEC



Total: 216.6 billion barrels

Source: Oil and Gas Journal



## ■ Across seas and oceans

Tankers provide the vital link in the chain of international oil supply, bringing crude to the refineries and products to the marketplace.

Oil tankers—like roads, railways and communications networks—are part of the industrial infrastructure. Tankers cannot be built overnight; and although contraction can be achieved rapidly, the cost of this is high. In contrast, flexibility is a virtue in today's trading environment, where oil contracts are often made, modified or unmade at a stroke.

The operators of the world's tanker fleets—about 40 per cent of all shipping afloat (Figure 7), compared with over 50 per cent a decade earlier—therefore today work outside a world of regularity, stability and commitment.

### ■ Growth of seaborne trade

In the 1960s, cheap oil and high economic growth had expanded oil

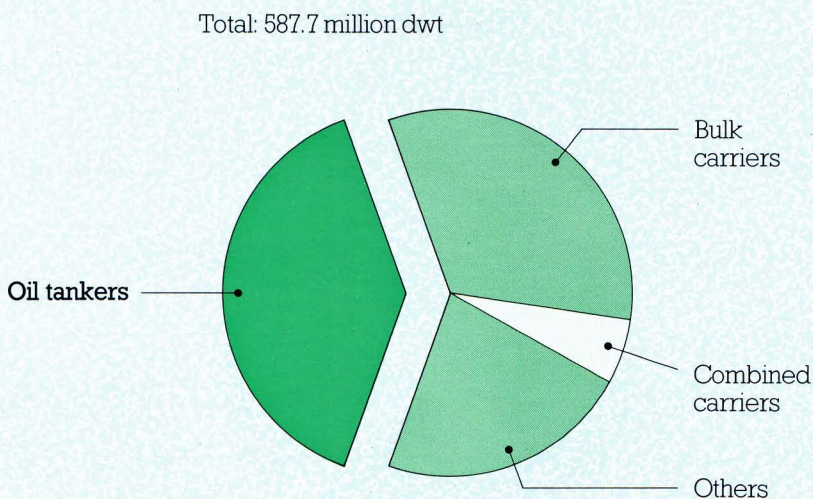
demand. The call on seaborne transportation had grown even faster. Most was for crude oil transportation, because refineries were highly concentrated in industrial countries; and most of it was for Middle East oil, since that had become the fastest-growing source.

The demand for tankers—principally to carry oil from Middle East ports to the United States, Western Europe and Japan—rose by more than 10 per cent each year. By the end of 1973, orders at shipyards for new tankers represented 90 per cent of all tonnage afloat.

Then, with expansion running strongly and tankers stretched in their operations as never before, came the fall in the demand for oil.

In addition, new oil producers appeared, closer to the big markets. In little more than a decade, production by non-OPEC countries—

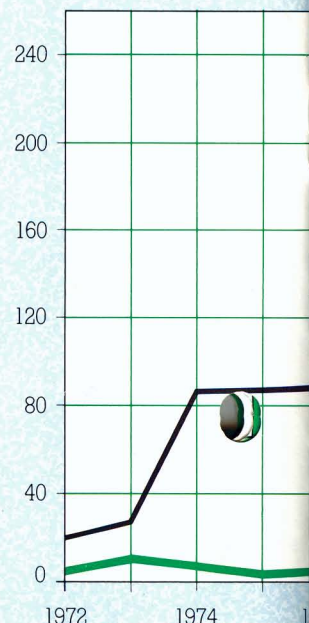
Figure 7 **The world fleet, by capacity**



As at 1 January 1988. Source: *Fearnley's Review*, 1987

Figure 8

**Freight rates and de**  
\$ per tonne



Using OPEC Marker Crude F

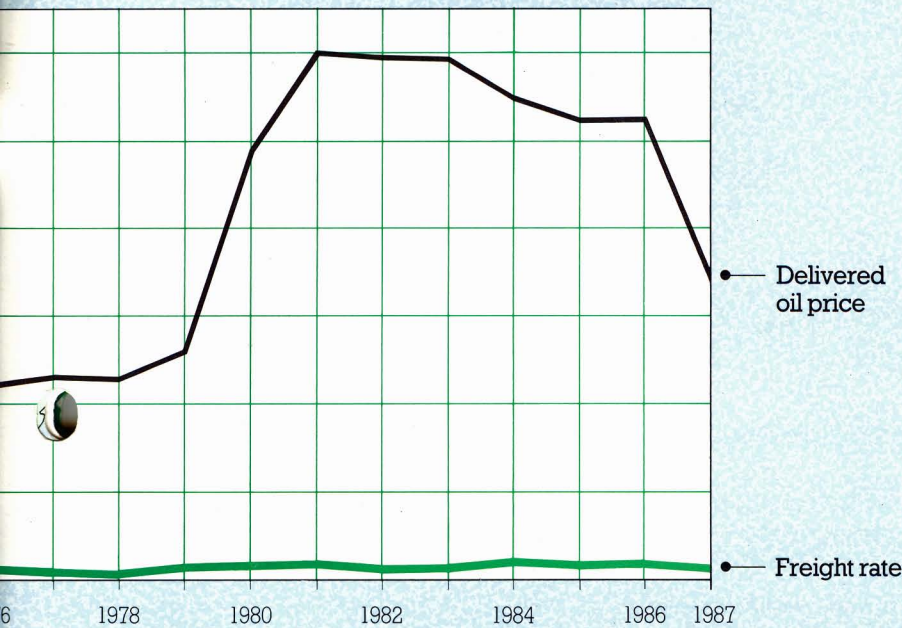
mainly outside the Middle East—rose by 50 per cent, and the North Sea overtook the Middle East as Europe's largest single supplier.

The Suez Canal reopened, lessening demand for round-the-Cape haulage. The very large crude carrier, which ranged in capacity up to 325 000 dwt and had been an important element in spurring economic growth, went into decline. A demand for short-haul trading sprang up in the market. This was not restricted to crude: the new diversely located refineries increased the demand for product-carriers, previously a small part of the fleet.

As uncertainty in oil markets increased, the supertanker on a 40-day voyage, carrying oil whose price was fluctuating, became a subject of speculation. To oil-traders it no longer seemed relevant that the largest of oil tankers could transport a tonne of oil five times more cheaply than the



## Delivered oil price developments



Price and Spot Freight Gulf to Rotterdam

competitive. The economy drive runs through the operational sphere, with tighter integration of ships and crews, and close management of running costs. The number of tankers owned or controlled by the larger operators has been drastically reduced.

In all these fields the major oil companies, once the owners of most of the oil in international trade and who had built large fleets and secured long-term charters with tanker owners, have taken the lead again – this time to absorb surplus capacity.

### ■ Responses by industry

For more than a decade there has been a steady and inexorable decline in the size of the fleet, and the bigger companies have made the largest reductions. In operating the reduced fleets, slow-steaming, deadfreight and idle-time are routine practices in cutting unit costs (Figure 10).

smallest. They preferred smaller parcels with quicker turnover and this choice became the order of the day. Despite the increases in the price of oil in 1973/4 and 1979/80, freight rates have remained below 1973 levels in money of the day (Figure 8) – and have fared much worse in real terms.

### ■ Continued overcapacity

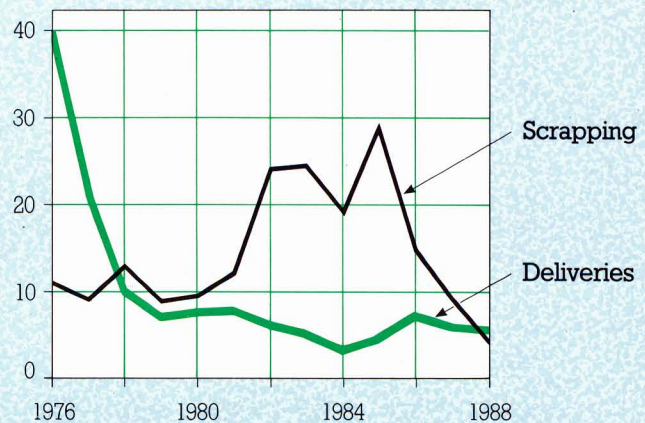
Dominating the tanker market today is the fact that current capacity is still surplus to demand and tankers trade at rates that do not support reinvestment in new ships. Despite the dramatic changes in deliveries and scrapping over the last dozen years (Figure 9) the situation remains highly competitive.

Traditional long-term charters are being abandoned, onerous ones renegotiated, vessels sold, scrapping programmes enforced, cheaper tonnage scouted and flexibility demanded in the battle to stay

Figure 9

### World fleet changes

Million dwt





One initiative by the tanker industry was the combined carrier, conceived to minimise ballast voyages by alternating between oil and dry-cargo trades. In the event, these ships did not easily accept the dual role intended for them. When demand ran high for tankers, they worked exclusively in oil; when it slackened during the mid-1970s, they left the field and gravitated toward dry cargoes, moving into the booming traffic in Japanese iron ore.

The rise of coal exports after the crisis and expanding movements of grain also attracted the smaller vessels, so that by 1980 at least three-quarters of the combined carriers were in the dry-bulk trades. Their employment in those trades has since fallen. Combined carriers now make up a smaller proportion of the declining overall fleet.

The current world tanker fleet (Figure 11) is around 70 per cent of the

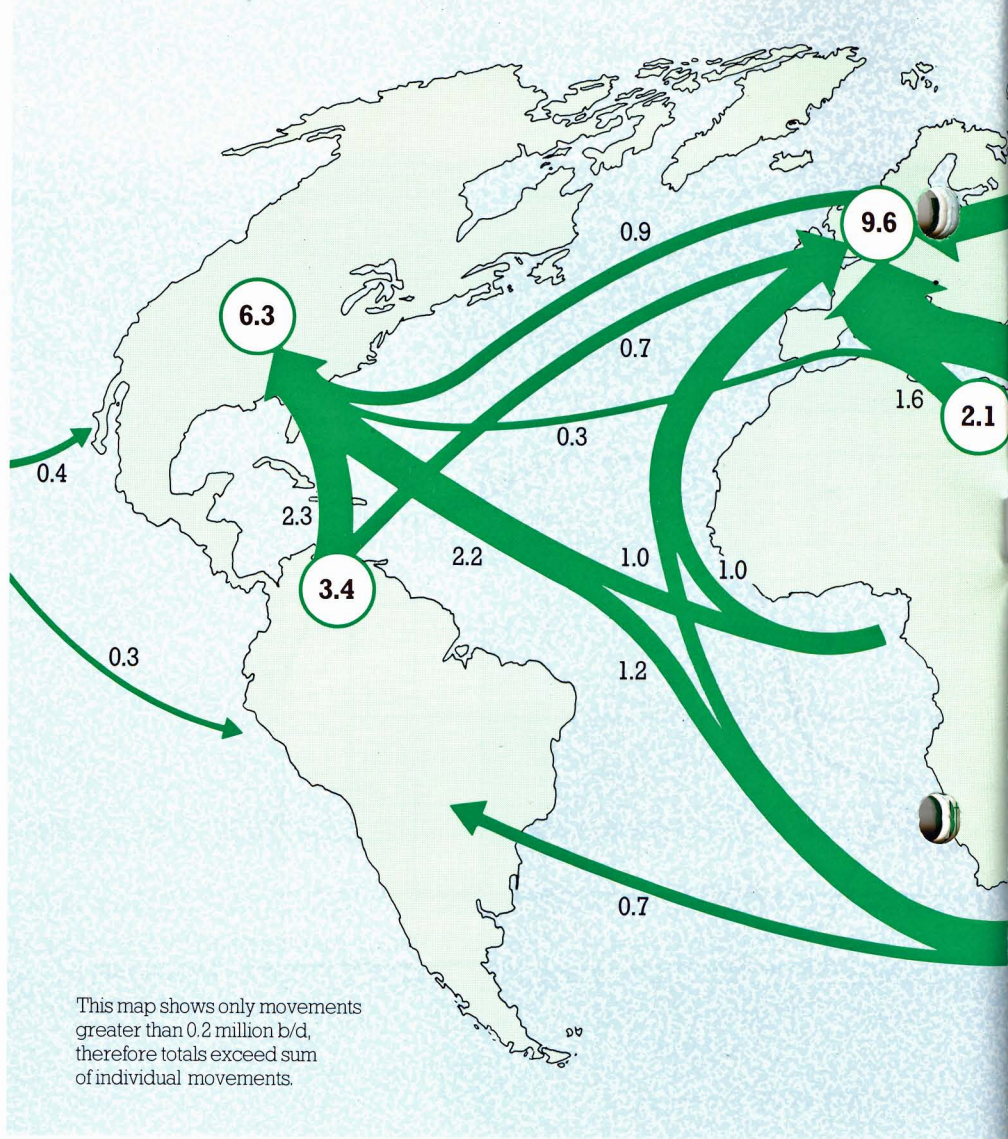
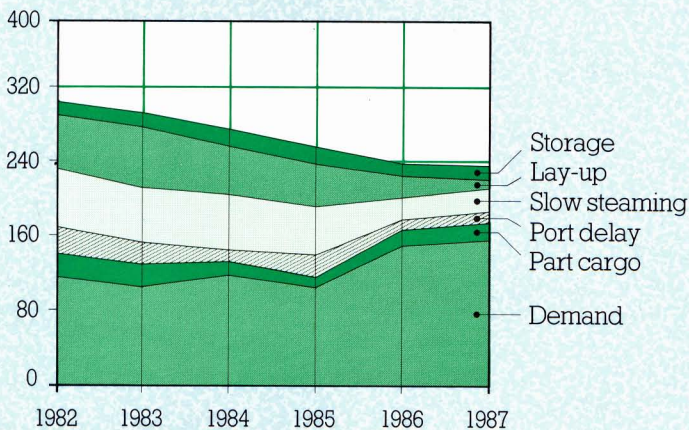


Figure 10

**Tanker supply and demand**  
Million dwt



capacity of a decade ago, more than matching the decline in seaborne oil trade over the same period. But as Figure 12 shows, international seaborne movement remains at the heart of the oil business.

**Looking to the future**

For the shipping industry in general, and the tanker industry in particular, the end of hostilities in the Gulf is most welcome. The long-range effect on shipping is not certain but is expected to be positive. Above all, seafarers will be able to proceed safely.

General cargo and liner vessels will benefit from renewed economic activity in the region, much of which will be the rebuilding of war-torn economies. A number of tankers that had been dedicated to war-related activities such as shuttle runs and storage will return to general trading. Over the medium to longer term this



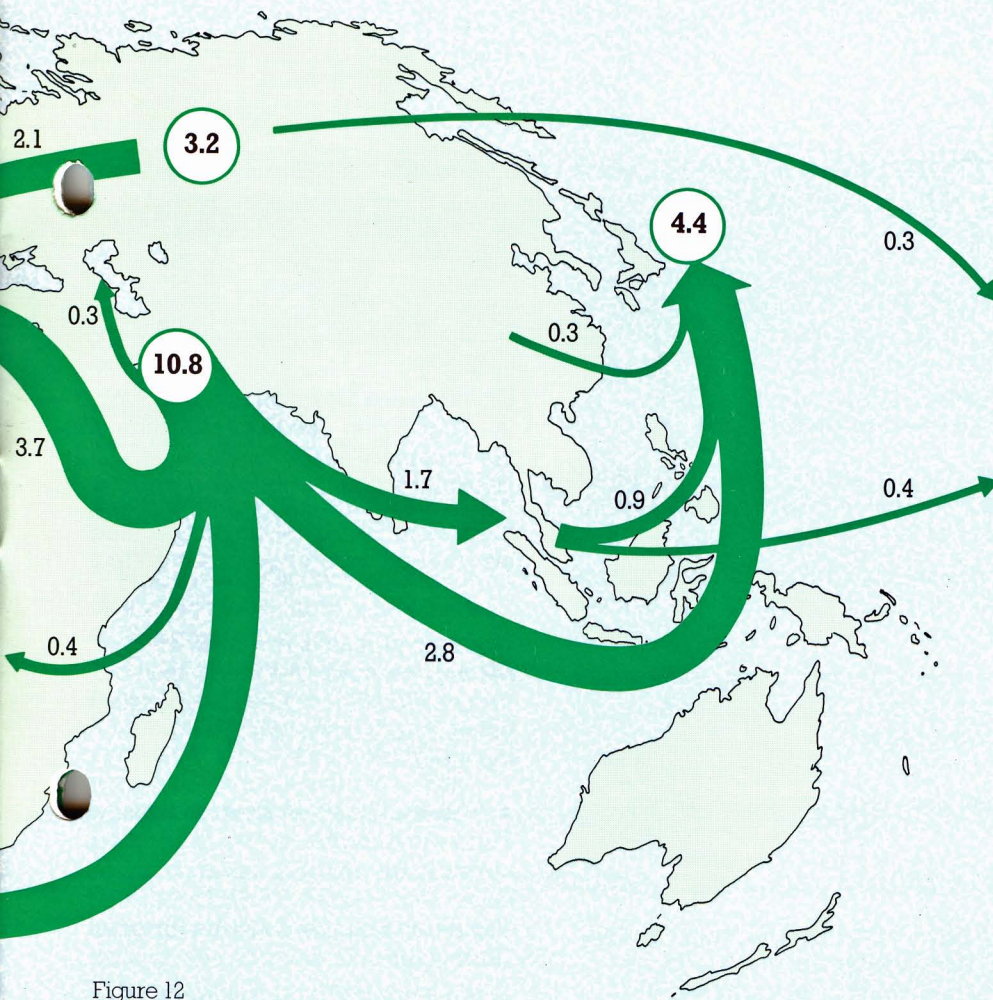


Figure 12  
**Crude oil and products: seaborne trade, 1987**  
 Million barrels daily. Main inter-area routes only

refineries; changed balances between long and short hauls as well as between short-term and long-term cargoes. The forces that ushered in the era of imbalance have not disappeared, but many of them, at least, are now better understood.

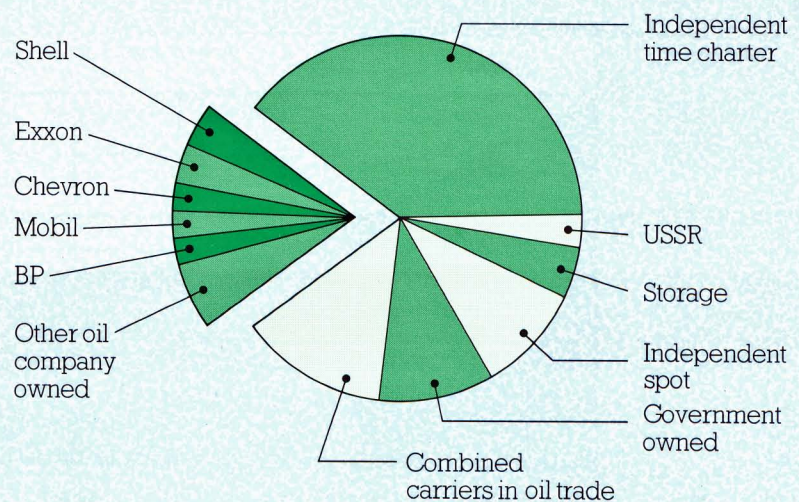
additional tonnage will be absorbed into the movement of oil which had been diverted by pipeline from the Gulf during the conflict and the increased oil flows associated with gradual growth in world oil trade.

The tanker industry today looks to a future that is positive, but not without qualification. It expects to meet squarely its own internal problems (costs, freight rates, competition, flexibility) but there are variables beyond its control which easily distort demand: foreign exchange rates and government policies are two examples. Neither are easily predictable, certainly not at a distance of 20 years – that is, one tanker-life ahead.

But the programme now underway seeks a much closer matching of tanker resources with expected demand. The programme also acknowledges an oil map re-drawn by market forces; new oil sources; new

Figure 11

**World tanker fleet**  
 At end of 1987



Summer capacity: 267.2 million dwt



## ■ The pipeline as exporter

In the movement of oil, the largest pipeline complexes are the normal gathering systems in any oilfield, carrying crude to a domestic refinery or to a loading terminal. Although parcels of crude they carry may go abroad, such pipelines are essentially part of the local infrastructure.

Important examples from early oil history include those of the Eastern United States and Texas. Modern examples are those in the North Sea carrying oil from deep water platforms to terminals on the mainland or Shetland/Orkney islands, and in Alaska from the North Slope to the open sea.

The other main group comprises pipelines chosen over other viable options for moving oil. They are of different kinds.

**Pipelines for transport economies** justify themselves by helping to

achieve economies of time, effort or cost. For example:

- The 1.6 million b/d Sumed pipeline as a partial alternative to the nearby Suez Canal;
- The 0.8 million b/d Panama pipeline as a partial alternative to the nearby Panama Canal.

These lines are an important source of revenue to the governments concerned.

**Politico-economic pipelines** are those constructed because of an overriding national or inter-governmental interest. For example:

- The 1.6 million b/d Iraqi pipeline system terminating at the Eastern Mediterranean Turkish port of Ceyhan;
- The Middle East Tapline, built with the active encouragement of the

United States Government, but now virtually closed due to the situation in the Lebanon; and

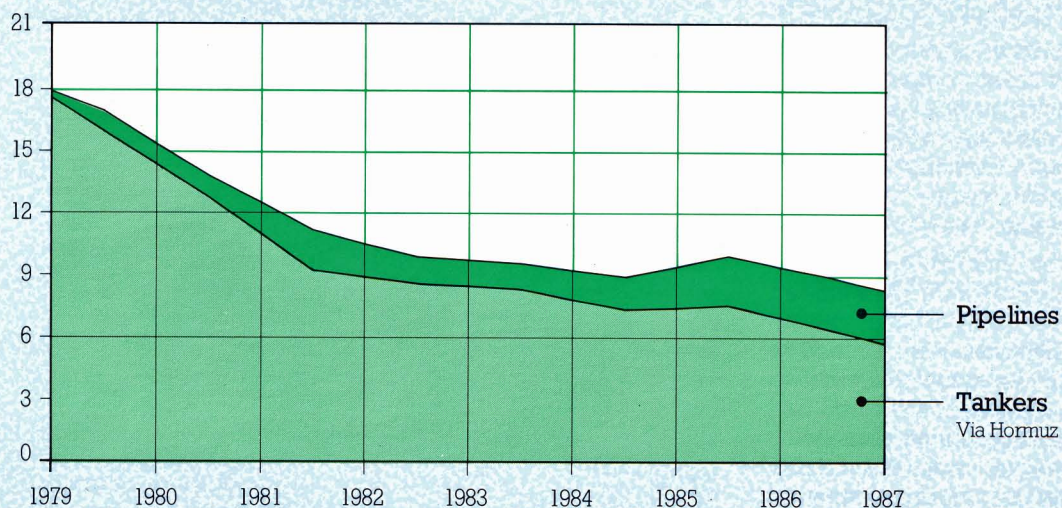
- If gaslines were being considered, those from the Soviet Union reaching into Europe would have to be added.

**Strategic pipelines** are built for security reasons. They seek to avoid the consequences of conflict, actual or possible, between nations. For example:

- The 3 million b/d Saudi Arabian Petroline from the largest fields to an outlet on the Red Sea lessens dependence on the Gulf port of Ras Tanura and exit through the Straits of Hormuz;
- A spur from Iraq which feeds into that system from the Basrah oilfields, with carrying capacity of 0.5 million b/d, soon to be incorporated in an

Figure 13

**Oil movements in the Gulf**  
Million barrels a day





independent 1.6 million b/d line to the Red Sea; and

- A proposed pipeline from Iranian oilfields to Jask in the Indian Ocean.

Pipelines of this kind already in operation in the Middle East have a total capacity of over 7 million b/d. By 1990, it could rise above 10 million. The pipeline is therefore performing an important complementary task in the international movement of oil, but even during the troubled times in the Middle East it was by no means ousting the tanker. Movements are relatively small (Figure 13); three-quarters of all the Middle East crude exports of 9 to 10 million b/d still go through the Straits of Hormuz.

But pipelines do affect the tanker market in a number of ways: by enabling the location of loading areas to be switched (for example, Yanbu – see Figure 14a); by reducing the length of voyages (Red Sea loading cuts four days off the voyage from Gulf ports to Western Europe); by circumventing obstacles to large tankers (for example the Suez Canal); by cutting special overheads or saving capital risks (Red Sea loadings of Saudi Arabian crude saved high insurance cover demanded for Gulf loadings during the Iran/Iraq war); and by transporting oil across international frontiers, eliminating or reducing the need for crude carriers.

By offering an alternative means of transportation across national boundaries the pipeline is strengthening its claims on international oil movements of the future.

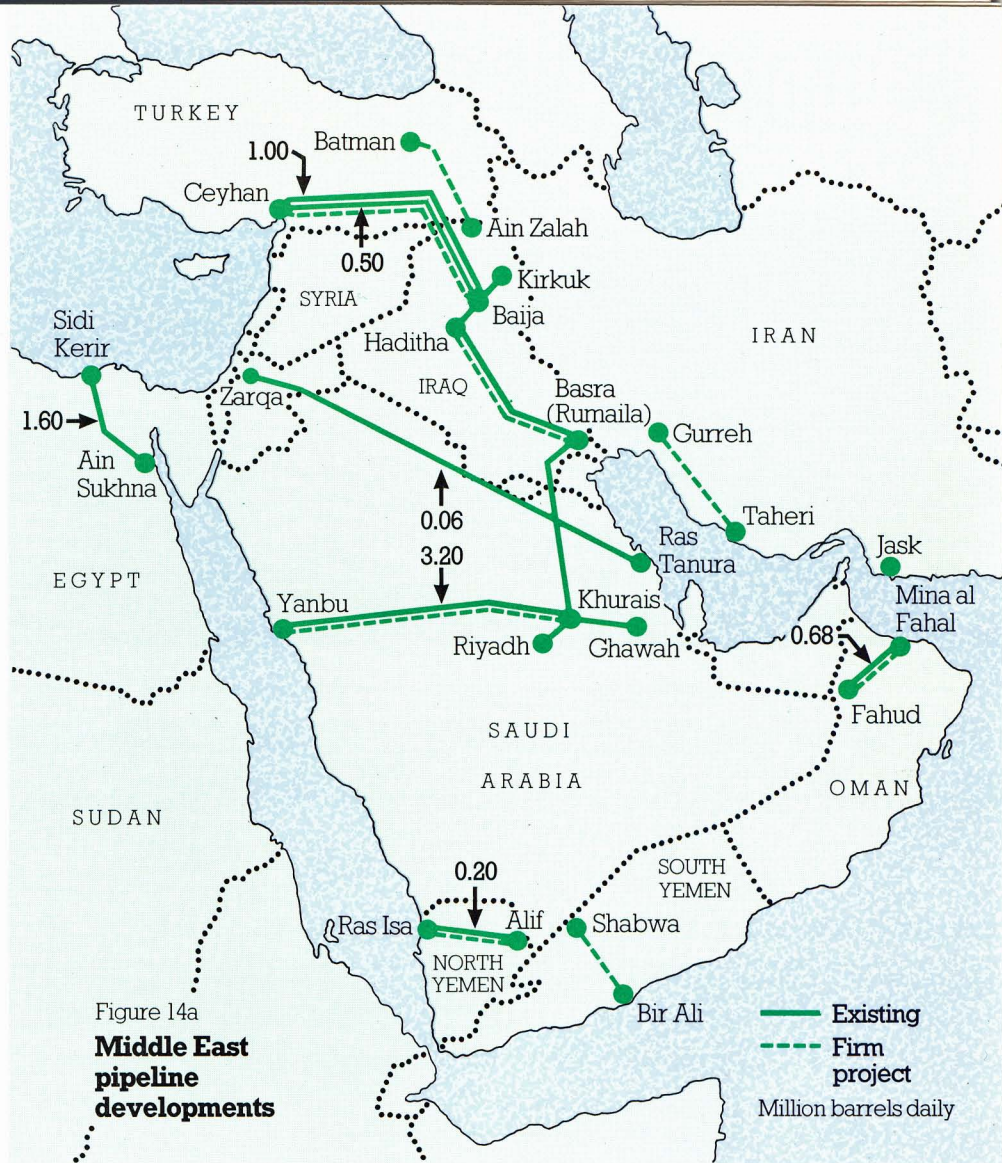


Figure 14a  
**Middle East pipeline developments**

Figure 14b  
**Middle East pipeline developments**  
Million barrels a day

|                             | Existing    |                              | Firm projects | Total       |
|-----------------------------|-------------|------------------------------|---------------|-------------|
| Saudi Petroline and Tapline | 3.26        |                              |               | 3.26        |
| Iraq to Turkey (Ceyhan)     | 1.50        | Expansion 1991               | 0.50          |             |
|                             |             | Iraq – Yanbu 1989            | 1.65          |             |
|                             |             | Iraq – Batman 1988/89        | 0.07          | 3.72        |
|                             |             | Rumaila – Haditha* 1991      | 0.90          |             |
| Iran                        |             | Gurreh – Bandar Taheri* 1989 | 0.60          |             |
|                             |             | Expansion 1989/90            | 0.07          | 0.75        |
| North Yemen                 | 0.20        | Expansion 1989               | 0.20          | 0.40        |
| South Yemen                 |             | Shabwa – Bir Ali 1990        | 0.25          | 0.25        |
| Egypt Sumed                 | 1.60        |                              |               | 1.60        |
| <b>Total</b>                | <b>7.24</b> |                              | <b>2.74</b>   | <b>9.98</b> |

\*Internal only, therefore not included in total, but may be used for exports in the long term.



