

# THE PETROLEUM DATASET: COUNTRY PROFILES<sup>1</sup>

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<sup>1</sup> Country Profiles cover each country that is included in the PETRODATA dataset. Information in the profiles covers the period prior to 2004.

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**AFGHANISTAN**

First discovery	1956
First production year	1967
Oil production	---
Gas production, 2001 (bn.m <sup>3</sup> )	0.22
Oil reserves	---
Gas reserves, 2001 (bn.m <sup>3</sup> )	49.9

bn.m<sup>3</sup> = billion cubic meters  
(Kulke, 1994; CIA, 2003)

***Discovery history***

Exploration in Afghanistan began in the 1930s when oil seeps were found in the northern part of the country. In 1956 oil was discovered in Sar-i-Pul. By the 1990s eight gas- and six oil-fields had been discovered in the northern Afghanistan (Kulke, 1994).

***Production history***

In Afghanistan the first formal gas production is reported from the fields Khwaja-Gogerdagh and Chodshakuherdagh in 1967. In 2002 two fields, Khwaja-Gogerdagh and Djarquduk, produced gas and Angot Field produced oil (Kulke, 1994; Petroleum Economist, 2002).

***Geographic distribution***

The most important regions in Afghanistan for oil and gas occurrences are the Amu-Darya and Afghan-Tajik basins in the northern part of the country. Central Afghanistan also has small hydrocarbon occurrences which are not economically viable (Persits et al., 1997; Wandrey et al., 1999; Kulke, 1994; Petroleum Economist, 2002; Petroleum Economist, 2003).

**ALBANIA**

First discovery	1918
First production	1918
Oil production, 1999 (m.t)	0.3
Gas production, 2001 (bn.m <sup>3</sup> )	0.03
Oil reserves, 2001 (m.t)	25
Gas reserves, 2001 (bn.m <sup>3</sup> )	3.3

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

***Discovery history***

In Albania exploration started in 1912 and the first discovery was made in 1918 in Drashovica. A new period with intensive exploration started in 1926 resulting in discovery of the Patos Field in the western Albania in 1926 and the Kuvoca Field in 1928. The Marinza Field was discovered in the same region in 1957. The Delvina Field was discovered in southern Albania in 1989 (Kulke, 1994; Anonymous, 2001; Oil & Gas Journal, 1999a).

**Production history**

The first formal production in Albania is reported for 1918 from the Drashovica Field (produced only two years). In 1935 the Kuvoca Field came on stream and in 1939 Patos followed. Production from the Marinza Field accounts over 50% of the total oil production, which has been decreasing since 1980. In 1998 an agreement was signed to develop the Delvina Field (Kulke, 1994; World Energy Council, 2001).

**Geographic distribution**

The most important regions for hydrocarbon production are located in the Adriatic Basin in the western and southern part of the country (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

**ALGERIA**

First oil discovered	1892
First production year	1958
Oil production, 1999 (m.t)	64.0
Gas production, 2001 (bn.m <sup>3</sup> )	82.8
Oil reserves, 1999 (m.t)	1 235
Gas reserves, 2001 (bn.m <sup>3</sup> )	4 522

m.t = million tonnes

bn.m<sup>3</sup> = billion cubicmeters

(Kulke, 1995; Washington Times, 1999; World Energy Council, 2001)

**Discovery history**

Although the first oil in Algeria was found in 1892 at Ain Zeft, followed by two further discoveries in 1914 and 1948, the real exploration started in 1956. Algeria is generally considered to have large unexplored hydrocarbon potential (Kulke, 1995; EIA, 2003).

**Production history**

Formal oil production started in 1958, and the oil industry was nationalized in 1970. Foreign companies regained access to Algerian fields in 1991 (Washington Times, 1999).

**Geographic distribution**

Largest producing fields are located in the Ghadames Basin in the central desert and in the Illizi Basin in the east (Persits et al., 1997; EIA, 2003).

**ANGOLA**

First oil discovered	1955
First production year	1956
Oil production, 1999 (m.t)	36.8
Gas production	---
Oil reserves, 2001 (m.t)	730
Gas reserves, 2002 (bn.m <sup>3</sup> )	45

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; 1Up Info, 1989a; World Energy Council, 2001; Mbendi, 2002)

#### ***Discovery history***

Intensive exploration started in the Cuanza Basin in 1952 and the Benefica oil field was discovered in 1955. In Cabinda exploration started in 1957 and in 1966 a giant offshore oil field, Malongo, was discovered. Several important offshore fields were discovered in the 1990s (Kulke, 1995; Anonymous, 2001; EIA, 2002; Mbendi, 2002).

#### ***Production history***

First formal oil production took place in 1956 and in 1973 oil became the main export product. Since 1980 the output of crude oil has increased by almost 600% and in 2002 Angola was the second largest oil producer in the sub-Saharan Africa (1Up Info, 1989a; World Energy Council, 2001; Mbendi, 2002; EIA, 2002).

#### ***Geographic distribution***

Largest offshore reserves are located in Cabina and in the northwest Angola. The Cuanza Basin and the region around Soyo city are the most important onshore regions (Mbendi, 2002; EIA, 2002).

### **ARGENTINA**

First discovery	1907
First production year	1907
Oil production, 1999 (m.t)	42.3
Gas production, 1999 (bn.m <sup>3</sup> )	38.0
Oil reserves, 2001 (m.t)	429
Gas reserves, 2001 (bn.m <sup>3</sup> )	748

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

#### ***Discovery history***

We found no exact information about when hydrocarbon exploration began in Argentina or when the first discoveries were made. Production started in 1907 in the San Jorge Basin. The Agua Blanca Field in the Santa Cruz-Tarjia Basin was discovered in 1926. In 1933 the Cacheuta Field was discovered in the Cuyo Basin and 1941 the El Porvenir Field in the Neuquen Basin. First discoveries in the south (Tierra del Fuego) were made in 1949. Offshore exploration started in 1980 and the Hidra Field was found in 1982 (Kulke, 1995; Schenk et al., 1999; Petroleum Economist, 2003; Anonymous, 2001).

#### ***Production history***

First formal production took place in 1907 at Comodoro Rivadavia in the San Jorge Basin. In 1958 the La Ventana Field in the Cuyo Basin started production and there has been production in the Neuquen Basin at least since 1970. The first offshore field, Hidra, came online in 1990 (Kulke, 1995; Schenk et al., 1999; World Energy Council, 2001; Maure et al., 2001; Petroleum Economist, 2003; Nordenstahl, 2003).

#### ***Geographic distribution***

Argentina's hydrocarbon reserves are spread across the country; the Santa Cruz-Tarjia Basin in the north, the Cuyo and Neuquen basins in the central Argentina and the San Jorge and Magallanes basins in the south (Kulke, 1995; Schenk et al., 1999; Petroleum Economist, 2003).

## AUSTRALIA

First discovery	1901
First production year	1906
Oil production, 1999 (m.t)	24.5
Gas production, 1999 (bn.m <sup>3</sup> )	31.7
Oil reserves, 2001 (m.t)	445
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 443

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

### *Discovery history*

First discovery was made in 1901 when the Hospital Hill Field was found near Roma (in the east Australia). Exploration in the 1960s resulted in major discoveries in the Surat Basin (in the east, west of Brisbane). The first offshore discoveries were made in 1965 in the Gippsland Basin (southeast of Melbourne) (Kulke, 1995; Geoscience Australia, 2002).

### *Production history*

Production from oil shale started in 1865. Production in the Hospital Field started in 1906 for local consumption. Large scale oil production started in 1961 and gas production in 1969. In 1990 over 90% of all hydrocarbon production came from offshore fields (Kulke, 1995; World Energy Council, 2001).

### *Geographic distribution*

The most important regions for oil and gas occurrences in Australia are the Gippsland offshore basin (southeast of Melbourne), the Eromanga and Surat basins in Queensland and the Northwest Shelf together with the Bonaparte Basin in Western Australia (Kulke, 1995; Steinshouer et al., 1999; World Energy Council, 2001; Petroleum Economist, 2003).

## AUSTRIA

First discovery	1930
First production year	1934
Oil production, 1999 (m.t)	1.1
Gas production, 2001 (bn.m <sup>3</sup> )	1.7
Oil reserves, 2001 (m.t)	12
Gas reserves, 2001 (bn.m <sup>3</sup> )	25

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; Society of Petroleum Engineers, 2002; CIA, 2003)

#### ***Discovery history***

Gas reserves at Wels (in the north) has been known at least since 1892. In the 1930s there were several discoveries in Bohemia near Vienna. The Puchkirchen Field in the Molasse Basin was discovered in 1956 (Kulke, 1994; Nachtmann, 2003).

#### ***Production history***

Gas production for local consumption started in Wels 1892. Commercial production began in 1934 when the Goesting Field in Bohemia came online. In 2001 several fields which had been discovered before the Second World War were still producing (Kulke, 1994; World Energy Council, 2001; Society of Petroleum Engineers, 2002).

#### ***Geographic distribution***

Bohemia in the east and the Molasse Basin in the north account for the major part of hydrocarbon production in Austria (Kulke, 1994; Pawlewicz et al., 2003; Petroleum Economist, 2003).

### **AZERBAIJAN**

First discovery	At least by 13 <sup>th</sup> century
First production year	1873
Oil production, 1999 (m.t)	13.8
Gas production, 1999 (bn.m <sup>3</sup> )	6.0
Oil reserves, 2001 (m.t)	161
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 370

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Turkemenistan2000, year unknown; World Energy Council, 2001)

#### ***Discovery and production history***

Already in the 13<sup>th</sup> century Marco Polo wrote about the oil seeps in the Baku region in the eastern part of Azerbaijan. In the 19<sup>th</sup> century Azerbaijan was a major hydrocarbon producer with an 'oil boom' during the period 1885 – 1920. In the 1990s Azerbaijan became again a major oil and gas producer, exploiting heavily its offshore reserves (Turkemenistan2000, year unknown; Mir-Babayev, 2002; Mir-Babayev, 2003; EIA, 2003; World Energy Council, 2001)

#### ***Geographic distribution***

Majority of oil and gas is found in the South Caspian Basin (onshore and offshore regions around Baku) (Persits et al., 1998; World Energy Council, 2001).

### **BAHRAIN**

First discovery	1932
First production year	1933/34
Oil production, 1999 (m.t)	2.2

Gas production, 2001 (bn.m <sup>3</sup> )	8.9
Oil reserves, 2001 (m.t)	20
Gas reserves, 2003 (bn.m <sup>3</sup> )	92

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; EIA, 2003)

#### ***Discovery history***

Bahrain's first and only discovery was made in 1932 when the Awali Field was discovered (Kulke, 1994; EIA, 2003).

#### ***Production history***

Oil production started in 1933/34. Production reached its peak in the 1970s and has been decreasing since (Kulke, 1994; World Energy Council, 2001; EIA, 2003).

#### ***Geographic distribution***

The Awali Field is located in the south (Petroleum Economist, 2003).

## **BANGLADESH**

First discovery	1955
First production year	1961
Oil production, 1999 (m.t)	0.1
Gas production, 1999 (bn.m <sup>3</sup> )	8.3
Oil reserves, 2001 (m.t)	5.7
Gas reserves, 2001 (bn.m <sup>3</sup> )	301

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Wandrey et al., 2000; Faruque et al., 2002; World Energy Council, 2001)

#### ***Discovery history***

First discovery was made in 1955 when the Sylhet Field was found in the Ganges-Brahmaputra Delta. It was followed by several other discoveries in the region; first offshore discovery was made in 1976 (the Kutubdia Field). Several new discoveries were made in the 1990s (Kulke, 1994; Wandrey et al., 2000; BAPEX, year unknown).

#### ***Production history***

First commercial production was reported in 1961 (the Chhatak Field). In the late 1990s the country was producing from 38 wells in ten fields and several fields were under development (Faruque et al., 2002; BISNET, year unknown; Daily Star, 2003; BAPEX, year unknown).

#### ***Geographic distribution***

The most important region for offshore and onshore occurrences is the Ganges-Brahmaputra Basin which covers the whole southern part of the country (Wandrey et al., 1999; Petroleum Economist, 2003).



**BELARUS**

First discovery	1944 – 1964
First production year	At least since 1990
Oil production, 1999 (m.t)	1.8
Gas production	---
Oil reserves, 2001 (m.t)	27
Gas reserves	---

m.t = million tonnes

(Kulke, 1995; World Energy Council, 2001)

***Discovery history***

We were not able to find information about when exploration started and when the first discoveries were made in Belarus. In the Pripyat Basin (shared between Belarus and Ukraine), first drillings were reported for the 1930s. Several discoveries were made in the basin during the period 1944 – 1964 (discovery date is assumed to be 1954 in the database). In the following years exploration became more systematic and succeeded in over 50 discoveries by 1975 (Kulke, 1995).

***Production history***

No exact information about when the oil and gas production started was available. Production year is set to 1990 in the database (the earliest year we know that there was production). Production has been modest and Belarus is dependant on oil and gas imports (Kulke, 1995; World Energy Council, 2001; INOGATE, 2003d).

***Geographic distribution***

The Pripyat Basin in the southeast Belarus is the most important area for oil and gas occurrences (INOGATE, 2003d; World Energy Council, 2001).

**BENIN**

First oil discovered	1968
First production year	1982
Oil production, 1999 (m.t)	0.05
Gas production	---
Oil reserves, 2001 (m.t)	1.1
Gas reserves	---

m.t = million tonnes

(Mbendi, 2000; World Energy Council, 2001)

***Discovery history***

In 1968 the Sèmè Field in the Gulf of Guinea, near the border to Nigeria, was discovered. The exploration for other fields in the same area started in 2000 (Mbendi, 2000).

***Production history***

Production started in 1982 (the Sèmè Field). In 1998 the field was shut down (Mbendi, 2000).

***Geographic distribution***

The Sèmè oil field is located in the Gulf of Guinea.

## **BOLIVIA**

First discovery	1925
First production year	1925
Oil production, 1999 (m.t)	1.8
Gas production, 1999 (bn.m <sup>3</sup> )	2.5
Oil reserves, 2001 (m.t)	17
Gas reserves, 2001 (bn.m <sup>3</sup> )	518

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; Anonymous, 2001; World Energy Council, 2001)

### ***Discovery history***

The Bermejo Field (in the Santa Cruz-Tarija Basin) was discovered in 1925 in the southern Bolivia. In 1927 the Camiri Field was discovered in the same basin. In the 1960s several discoveries were made near Santa Cruz. In the 1980s and 1990s exploration in the region between Santa Cruz and La Paz resulted in a number of oil and gas discoveries (Schenk et al., 1999; Anonymous, 2001; Petroleum Economist, 2003).

### ***Production history***

In Bolivia the first commercial production of oil took place in 1925 (the Bermejo Field). Gas production started in 1968. Production volumes have been increasing throughout the decades (Kulke, 1995; World Energy Council, 2001).

### ***Geographic distribution***

The most important region in Bolivia for oil and gas occurrences is the Santa Cruz-Tarija Basin, which is located in the central and southern part of the country. The Madre dos Dios Basin also has some potential, but until 1991 only one well had been drilled successfully (Kulke, 1995; Schenk et al., 1999; Petroleum Economist, 2003).

## **BOSNIA and HERZEGOVINA**

We were not able to find any exact information about hydrocarbon exploration, discovery and production in Bosnia-Herzegovina. Two occurrences are reported in the Pannonian Basin (Obudovac and Bijeljuna) in the northwest of the country. The country does not produce hydrocarbons (Kulke, 1994; Pawlewicz et al., 2003; CIA, 2003).

## **BRAZIL**

First discovery	1939
First production year	1940
Oil production, 1999 (m.t)	55.8
Gas production, 1999 (bn.m <sup>3</sup> )	6.7

Oil reserves, 2001 (m.t)	1 172
Gas reserves, 2001 (bn.m <sup>3</sup> )	231

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

### ***Discovery history***

First discovery was made in the Reconcavo Basin (the Lobato Field) in the northeastern part of Brazil in 1939. This was followed by several other discoveries in the region. First offshore discovery was made in the Bahia Sul Basin (the Guriri Field) in 1969. In the 1970s a number of offshore fields were discovered in the Campos Basin (Kulke, 1995; Schenk et al., 1999; Anonymous, 2001; Petroleum Economist, 2003).

### ***Production history***

In Brazil the first commercial oil production took place in 1940 when the Lobato Field in the Reconcavo Basin came on stream. In 1977 production started in the Campos Basin (the Enchova Field). Gas production started in 1954 but there is no information about the location (Kulke, 1995; Schenk et al., 1999; World Energy Council, 2001; Petroleum Economist, 2003; Santanna, year unknown; Society of Petroleum Engineers, 2003; PETROBAS, 2004)

### ***Geographic distribution***

The most important onshore regions for oil and gas occurrences are the Reconcavo and Sergipe-Alagoas basins in the middle-eastern part of the country. Campos and Santos basins in the south-east Brazil are the most significant regions for offshore oil and gas potential. The basins in the northern Brazil are underexplored (Kulke, 1995; Schenk et al., 1999; Petroleum Economist, 2003).

## **BRUNEI**

First discovery	1924
First production year	1929
Oil production, 1999 (m.t)	8.9
Gas production, 1999 (bn.m <sup>3</sup> )	9.4
Oil reserves, 2001 (m.t)	184
Gas reserves, 2001 (bn.m <sup>3</sup> )	391

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

### ***Discovery history***

In Brunei exploration for oil and gas started in 1899 and the first discovery was made in 1924 when the Belait Field was found. This was followed by the discovery of Seria-Rasau fields in 1929. The Ampa Field was the first offshore discovery (1963). After that the offshore exploration intensified resulting in several discoveries (Kulke, 1994; Anonymous, 2001).

### ***Production history***

First commercial oil and gas production in Brunei took place in 1929 and the first offshore field came on stream in 1964. In 2001 over 90% of all hydrocarbon production was exported

to other South Asian countries (ASEAN Centre of Energy, 2000; World Energy Council, 2001).

#### **Geographic distribution**

In Brunei the majority of oil and gas is found in the Baram Delta/Brunei-Sabah Basin (Steinshouer et al., 1999; Petroleum Economist, 2003).

## **BULGARIA**

First discovery	1951
First production year	1954
Oil production, 1999 (m.t)	0.03
Gas production, 2001 (bn.m <sup>3</sup> )	0.004
Oil reserves, 2001 (m.t)	2.0
Gas reserves, 2001 (bn.m <sup>3</sup> )	3.7

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

#### **Discovery history**

Exploration started in 1944 and in 1951 the Tyulenovo Field in the West Black Sea Basin (in the northeast) was discovered. Since the early 1960s several fields have been discovered in the Carpathian-Balkanian Basin (in the northwest). The first offshore discovery was made in 1984 (the Samotino More Field) but systematic search for offshore fields started first in 1992 (Kulke, 1994; Anonymous, 2001; Petroleum Economist, 2003; Melrose Resources, 2001).

#### **Production history**

The first formal production in Bulgaria took place in 1954 (the Tyulenovo Field). Chiren gas field started to produce in 1966. Oil production peaked in 1967 and in 1991 Bulgaria produced from 105 oil and three gas wells (Kulke, 1994; Melrose Resources, 2001; EasternOilServices Inc., 2003; Melrose Resources, 2004).

#### **Geographic distribution**

Hydrocarbon reserves are concentrated in the Carpathian-Balkanian Basin in the north-western part of the country and in the West Black Sea Basin in the north-east Bulgaria. (Kulke, 1994; Pawlewicz et al., 2003; Petroleum Economist, 2003).

## **CAMBODIA**

#### **Discovery history**

Exploration for oil and gas in Cambodia started in the 1950s and in the early 1960s some oil seeps were found. Exploration in offshore areas started in the 1970s but succeed first in the 1990s in some founds in the Gulf of Thailand (CCOP, 2002a; CCOP, 2002b).

#### **Production history**

No production is reported. In 1999 an agreement was signed to develop offshore blocks in the Gulf of Thailand (CCOP, 2002b).

**Geographic distribution**

There are some hydrocarbon occurrences in the Gulf of Thailand (offshore) and in the Tonle Sap Basin (onshore) (Steinshouer et al., 1999; CCOP, 2002b).

**CAMEROON**

First oil discovered	1955
First production year	1978
Oil production, 1999 (m.t)	4.8
Gas production, 2000 (bn.m <sup>3</sup> )	2.0
Oil reserves, 2001 (m.t)	55
Gas reserves, 2000 (bn.m <sup>3</sup> )	110

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; Mbendi, 2000; World Energy Council, 2001)

**Discovery history**

The first oil discovery was made in 1955 in the Douala Basin, which mainly contains gas reserves. In the 1970s exploration began in the Rio del Rey Basin (in the northeast) resulting in several discoveries. Later the focus shifted again to the Douala Basin and the Kribi-Campo region further in the south (Mbendi, 2000).

**Production history**

First formal production in Cameroon took place in 1978. We were not able to find information about the exact location of this production but assume it to be in the Rio del Rey Basin. The production increased in 1996 when the Ebome Field in the Kribi-Campo area came online (Mbendi, 2000; World Energy Council, 2001; EIA, 2002).

**Geographic distribution**

All hydrocarbon reserves in Cameroon are located near the coastline, both onshore and offshore. Largest production occurs in the Niger Delta (the Rio del Rey Basin) in the northeast. The Douala Basin south of the Delta is also significant and since the mid-1990s the Kribi-Campo area (south-eastern coastline) also produces significant volumes of hydrocarbons (Mbendi, 2000).

**CANADA**

First discovery	At least by 1857
First production year	1857
Oil production, 1999 (m.t)	89.8
Gas production, 1999 (bn.m <sup>3</sup> )	176.2
Oil reserves, 2001 (m.t)	779
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 719

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

**Discovery history**

First oil in Canada was discovered in 1858 at the Oil Springs Field in the southern Ontario. First gas field was discovered near Medicine Hat, Alberta, in 1883. In northern Canada the Norman Wells Field was discovered in 1920 and in the Arctic Hecla Field (the Sverdrup Basin) was discovered in 1972. Offshore exploration started in the early 1960s and one of the first fields discovered was the Drake Point Field (the Sverdrup Basin) around 1970. First offshore fields in the Atlantic coast were discovered in the 1970s (Kulke, 1995; Geo-Help Inc, 2004; Petroleum Economist, 2003; Anonymous, 2001; Earth Sciences and Resources Institute, 1995; AINC-INAC\_1, year unknown; Klett et al., 1997; AGRA Earth and Environmental Limited, 1998; Hydro, year unknown).

**Production history**

First commercial oil production took place in 1857 in the southern Ontario. In Alberta production started in 1901 near Medicine Hat. In the northern part of the country the Norman Wells Field has been operating at least since 1933. In the Mackenzie Delta the first fields (Tugla and Niglintak) are expected to come on stream in 2009, although there has been test production in the Amauligak Field earlier (it is possible that there has been some production as well, but we were unable to confirm this information). In the east (offshore fields in the Atlantic) first production occurred in 1992 (the Cohasset Field). As far as we know, the offshore fields in Arctic were not producing 2002 (Kulke, 1995; Geo-Help Inc, 2004; Northwest Territories, year unknown; Klett et al., 1997; Mackenzie Gas Project, 2004a; Mackenzie Gas Project, 2004c; AGRA Earth and Environmental Limited, 1998; Morrell, 1995; AINC-INAC\_1, year unknown; AINC-INAC\_4, year unknown).

**Geographic distribution**

Alberta and the southern Ontario are the most important regions for hydrocarbon reserves. The Mackenzie Delta and the Sverdrup Basin in the north and basins in the Atlantic coast (offshore) are also significant (Kulke, 1995; Klett et al., 1997; Petroleum Economist, 2003).

**CHAD**

First oil discovered	1974
First production year	1975
Oil production	---
Gas production	---
Oil reserves, 1995 (m.t)	35 - 40
Gas reserves	---

m.t = million tonnes

(1Up Info, 1988; Hueper, 2002; Kulke, 1995)

**Discovery history**

Exploration in Chad started in the 1970s. First discovery was made in the Lake Chad Basin in 1974 (the Sédigi Field). This was followed by discoveries in the Doba and Doseo basins (in the southern Chad) in the late 1970s. Civil war that broke out in 1979 effectively put stop to further exploration and development of fields. In 1988 exploration restarted and the construction of the Chad–Cameroon pipeline will make production possible by the mid 2000s (1Up Info, 1988; Mbendi, 2000; Hueper, 2002; EIA, 2002).

**Production history**

The first formal production of oil was in 1975 (the Sédigi Field). The field was shut down in 1980 due to a civil war in the region. Production from the Doba Basin is expected to start 2003/2004 (Mbendi, 2000; Hueper, 2002; U.S. Geological Survey, 2003; Exxon Mobil Corporation, 2003).

### **Geographic distribution**

In Chad the major regions for hydrocarbon potential are the Doba and Doseo Basins in the south and the Lake Chad Basin north of the Lake Chad (Mbendi, 2000).

## **CHILE**

First discovery	1945
First production year	1950
Oil production, 1999 (m.t)	0.6
Gas production, 2001 (bn.m <sup>3</sup> )	1.2
Oil reserves, 2001 (m.t)	20
Gas reserves, 2003 (bn.m <sup>3</sup> )	67.7

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001; CIA, 2003)

### **Discovery history**

Exploration started in the Magallenes Basin in the south in 1915 but no discoveries were made at this time. First discovery is reported in 1945 on Tierra del Fuego Island (the Manantiales Field) and was followed by several discoveries in the Magallenes Basin. (Kulke, 1995; Anonymous, 2001; Petroleum Economist, 2003).

### **Production history**

In Chile the first formal oil production is reported for 1950 from the Manantiales Field and since then several fields in the Magallenes Basin has come on stream. Oil output increased rapidly until 1965, but since 1982 oil production has steadily declined (World Energy Council, 2001; Kulke, 1995).

### **Geographic distribution**

The only important area in Chile for oil and gas occurrences is the Magallenes Basin in the south (onshore and offshore areas on Tierra del Fuego Island and north of the island) (Schenk et al., 1999; Petroleum Economist, 2003; Kulke, 1995; World Energy Council, 2001).

## **CHINA**

First discovery	1897
First production year	1907
Oil production, 1999 (m.t)	160.2
Gas production, 1999 (bn.m <sup>3</sup> )	24.2
Oil reserves, 2001 (m.t)	4 793
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 368

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

### ***Discovery history***

In the Junggar Basin (in the northwest) oil seeps have been known for centuries and first commercial discovery was made there in 1897 near Urumqi (the Dushanzi Field). Systematic exploration started in the 1950s and in 1959 a giant field (the Daqing Field) in the Songliao Basin was discovered in the north-west China. Offshore exploration started in 1958 in the Gulf of Bo Hai resulting in several discoveries. Intensive exploration for both onshore and offshore reserves continues in China (Kulke, 1994; CCOP, 2002c; CNPC\_8803).

### ***Production history***

Production started in 1907 when the Yanchang Field in the Ordos Basin came on stream. Since 1949 production of crude oil has been increasing and in 1978 the country became one of the largest oil producers in the world. Significant gas production started in 1975 (Kulke, 1994; CCOP, 2002c).

### ***Geographic distribution***

The most important onshore areas for hydrocarbon occurrences in China are Songliao Basin in the northeast, North China Basin and Sichuan Basin in the southwest near Chongqing. Offshore reserves are concentrated in Gulf of Bo Hai and in the basins around the island of Hainan (Kulke, 1994; Steinshouer et al., 1999; Petroleum Economist, 2003).

## **COLOMBIA**

First discovery	1918
First production year	1918
Oil production, 1999 (m.t)	42.8
Gas production, 1999 (bn.m <sup>3</sup> )	5.2
Oil reserves, 2001 (m.t)	323
Gas reserves, 2001 (bn.m <sup>3</sup> )	193

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; Link, 1952; World Energy Council, 2001)

### ***Discovery history***

In Colombia the first discovery was made in the Middle Magdalena Basin (the Infantas Field) in 1918. It was followed by the Carbonera Field in the Maracaibo Basin in 1939. First discovery in the Putumayo-Orient-Maranon Basin is reported in 1959 (the Caribe Field). In the Llanos Basin oil was first found in 1969 (the Castilla Field). Offshore field, Chuchupa, was discovered in 1973 (the Guajira Basin) in the north (the Caribbean Sea) (Kulke, 1995; Anonymous, 2001; Petroleum Economist, 2003; Schenk et al., 1999; Anonymous, 1996).

### ***Production history***

The first formal production in Colombia is reported for 1918 (the Infantas Field). In the Putumayo-Orient-Maranon Basin production started in 1968 (the Orito Field). In the Guajira Basin production from onshore fields and the only offshore reserve started in 1977 (Link, 1952; Petrobank Energy and Resources Ltd., year unknown; Petroleum Economist, 2003;



Schenk et al., 1999; Anonymous, 1996; Mera Petroleums Inc., 1999; American Friends Service Committee, year unknown; Anonymous, 1998; Simmons, 2001; Ismi, 2000)

### **Geographic distribution**

The most important areas for oil and gas occurrences are the basins in the northwest (Guajira, Lower and Middle Magdalena, and Maracaibo), the basins in Central-Colombia (Upper Magdalena and Llanos) and the Putumayo-Orient-Maranon Basin in the south (Schenk et al., 1999; Petroleum Economist, 2003; Kulke, 1995)

## **CONGO (BRAZZAVILLE)**

First oil discovered	1951
First production year	1957
Oil production, 1999 (m.t)	14.5
Gas production	---
Oil reserves, 2001 (m.t)	212
Gas reserves, 1992 (bn.m <sup>3</sup> )	91

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Mbendi, 2000; EIA, 2003; World Energy Council, 2001)

### **Discovery history**

Exploration started in 1951 and the first onshore discovery was made in the same year (Pointe Indienne) near the coast in the southern part of the country. This was followed by the discovery of an offshore field (Emeraude) in 1969. During the next decades several discoveries have been made both onshore and offshore (Kulke, 1995; EIA, 2003).

### **Production history**

The first commercial production in Congo took place in 1957 (the Pointe Indienne Field). From 1988 to 1998 the production of crude oil almost doubled and production was increasing at least until 2003 (Mbendi, 2000; EIA, 2003).

### **Geographic distribution**

All fields are located in the coastal basins (Kulke, 1995).

## **CONGO (KINSHASA)**

First oil discovered	1970
First production year	1975
Oil production, 1990 (m.t)	1.35
Gas production	---
Oil reserves, 1991 (m.t)	7.6
Gas reserves	---

m.t = million tonnes

(Anonymous, 2001; Kulke, 1995; 1Up Info, 1993)

### **Discovery history**

Exploration started in the 1950s and the first offshore discovery was made in 1970. First onshore field (Kinkasi) was discovered in 1972 (Kulke, 1995; 1Up Info, 1993; Anonymous, 2001; Mbendi, 2000).

#### ***Production history***

The commercial production of oil from offshore fields started in 1975. Production from onshore fields started in 1979. Although gas reserves have been found in the eastern Congo, no gas production had taken place prior to 2000 (1Up Info, 1993; Mbendi, 2000).

#### ***Geographic distribution***

All oil reserves are located near country's 22 km long coastline, both onshore and offshore. Gas has been discovered near the border to Rwanda (Mbendi, 2000).

### **COTE D'IVOIRE**

First oil discovered	1970s
First production year	Late 1970s
Oil production, 1999 (m.t)	0.5
Gas production	---
Oil reserves, 2001 (m.t)	14
Gas reserves	---

m.t = million tonnes

(Mbendi, 2000; World Energy Council, 2001)

#### ***Discovery history***

The first offshore fields (Espoir and Belier) were discovered in the 1970s (discovery year assumed to be 1970 in the dataset). The Lion Field was discovered in 1994 and gas field Foxtrot in 1993, both located in the same offshore area as the earlier discoveries. No onshore discoveries have made (Mbendi, 2000; Vanco Côte d'Ivoire Ltd., 2002).

#### ***Production history***

Oil production started in the late 1970s (assumed to be 1975 in the dataset). Gas production started in the mid-1990s (Mbendi, 2000).

#### ***Geographic distribution***

All oil and gas reserves are located offshore in the Gulf of Guinea (Persits et al., 1997).

### **CROATIA**

First discovery	At least by the 1880s
First production year	1880
Oil production, 1999 (m.t)	1.5
Gas production, 2001 (bn.m <sup>3</sup> )	1.7
Oil reserves, 2001 (m.t)	11
Gas reserves, 2001 (bn.m <sup>3</sup> )	34.3

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters  
(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

#### **Discovery history**

Oil seeps in the northern Croatia (the Pannonian Basin) have been known for centuries. More systematic exploration of the basin started in the 1940s and the Klostar Field was discovered in 1952. This was followed by several important discoveries in the 1950s and 1970s. Offshore exploration started in the early 1970s and the first discovery (Ivana) was made in 1977 (Kulke, 1994; Anonymous, 2001; INA\_b, year unknown; Lindquist, 1999a).

#### **Production history**

In Croatia oil was extracted already in the 1880s and gas production started in 1929. In the 1970s and 1980s gas production was steadily increasing and the oil output peaked in the 1980s. Offshore production started in 1999 (the Ivana Field) and several fields are expected to come on stream in 2005 (Kulke, 1994; INA\_b, year unknown; Hall et al., 2000; Yahoo! Inc, 2002a; Platts, year unknown).

#### **Geographic distribution**

The most important areas in Croatia for oil and gas occurrences are the onshore basin Pannonian in the northern part of the country and the offshore basin Po in the Adriatic Sea. The Adriatic Basin is considered to have large hydrocarbon potential (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003; INA\_b, year unknown).

## **CUBA**

First discovery	1881
First production year	Beginning of the 20 <sup>th</sup> century
Oil production, 1999 (m.t)	2.1
Gas production, 2001 (bn.m <sup>3</sup> )	0.6
Oil reserves, 2001 (m.t)	44
Gas reserves, 2001 (bn.m <sup>3</sup> )	42.6

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters  
(Kulke, 1995; World Energy Council, 2001; CIA, 2003)

#### **Discovery history**

Although the first oilfield in Cuba, the Motembo Field, in the northern part of the island, was discovered in 1881, active exploration started in the beginning of the 20<sup>th</sup> century. In 1914 the Bacuranao Field was discovered near Havana, followed by the discovery of the Jarahueca Field in the central Cuba in 1943. The Cristales and Jatibonico fields in the same area were discovered in 1954. New discoveries have been made in the late 1990s (Kulke, 1995; Petroleum Economist, 2003; Anonymous, 2001).

#### **Production history**

There is no exact information about the first commercial oil production in Cuba, but production from Motembo started in the beginning of the 20<sup>th</sup> century. The Jarahueca and Jatibonico fields started production in the 1940s/1950s and by 1966 fields near Havana were producing (Kulke, 1995; Pinon, 2004; Freehand.ru, year unknown; Petroleum Economist, 2003; World Energy Council, 2001).

**Geographic distribution**

In Cuba the most important areas for oil and gas occurrences are located in the northern and central part of the island (Earth Sciences and Resources Institute, 1995; Petroleum Economist, 2003; Kulke, 1995).

**CZECH REPUBLIC**

First discovery	1914
First production year	At least since 1960
Oil production, 1999 (m.t)	0.2
Gas production, 2001 (bn.m <sup>3</sup> )	0.16
Oil reserves, 2001 (m.t)	11
Gas reserves, 2001 (bn.m <sup>3</sup> )	3.0

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

**Discovery and production history**

We were not able to find exact information about exploration, discovery and production in Czech Republic. First fields have been discovered prior to 1945, probably already in the 19<sup>th</sup> century. In former Czechoslovakia gas production peaked in the 1960s and oil production in the beginning of the 1970s (Kulke, 1994; EuroGas, Inc. 1996b; Pawlewicz et al., 2003; U.S. Department of Energy, 2003).

**Geographic distribution**

The most important areas for oil and gas occurrences are the Bohemia and the North Carpathian basins in the southeast (Pawlewicz et al., 2003; Petroleum Economist Ltd, 2003; Kulke, 1994).

**DENMARK**

First discovery	1966
First production year	1972
Oil production, 1999 (m.t)	14.7
Gas production, 2001 (bn.m <sup>3</sup> )	8.3
Oil reserves, 2001 (m.t)	122
Gas reserves, 2001 (bn.m <sup>3</sup> )	82

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

**Discovery history**

Although exploration in Denmark started in 1935, the first discovery was made in 1966 when the offshore field Kraka was found in the North Sea Graben. In the following decades several discoveries were made in the same area (Kulke, 1994; Pawlewicz et al., 2003; Anonymous, 2001; Petroleum Economist, 2003).

**Production history**

First formal production took place in 1972 (the Dan Field). Several fields followed in the 1980s and 1990s. About 75% of oil production was exported in 1999 (Kulke, 1994; World Energy Council, 2001).

**Geographic distribution**

All fields are located offshore, in the North Sea (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

**ECUADOR**

First discovery	1913
First production year	1917
Oil production, 1999 (m.t)	19.7
Gas production	---
Oil reserves, 2001 (m.t)	302
Gas reserves, 2003 (bn.m <sup>3</sup> )	8

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(World Energy Council, 2001; EIA, 2003)

**Discovery history**

Several small discoveries were made in the Santa Elena Peninsula in the 1910s. In the Putumayo-Orient-Maranon Basin exploration succeed in 1967 (the Lago Agrio Field). This has been followed by numerous discoveries in the region. The only offshore discovery was made in 1970 when the Amistad Field was found in the Progreso Basin (south Ecuador). In the 1990s exploration was still ongoing and several discoveries were made (World Energy Council, 2001; Kulke, 1995; Schenk et al., 1999; Petroleum Economist, 2003; Anonymous, 2001).

**Production history**

The first commercial production in Ecuador took place in 1917 in the Santa Elena Peninsula and at least since 1972 several fields in the Oriente Basin have been under production. The offshore field Amistad started production in 2002. Ecuador exports over 60% of its hydrocarbon production (World Energy Council, 2001; ChevronTexaco, 2003b; EIA, 2003; Noble Energy, 2002).

**Geographic distribution**

The most important areas in Ecuador for oil occurrences are the Santa Elena Peninsula on the south-west coast and the Putumayo-Orient-Maranon Basin in the northeast (east of the Andeans) (Schenk et al., 1999; Petroleum Economist, 2003; World Energy Council, 2001).

**EGYPT**

First oil discovered	1868
First production year	1910

Oil production, 1999 (m.t)	41.4
Gas production, 1999 (bn.m <sup>3</sup> )	15.5
Oil reserves, 2001 (m.t)	529
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 223

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic metres

(Kulke, 1995; Lindquist, 1998a; World Energy Council, 2001)

#### ***Discovery history***

The first oil in Egypt was found in 1868 at the western edge of the Gulf of Suez (the Gemsa Field). Systematic exploration since 1960s has resulted in several discoveries (Kulke, 1995).

#### ***Production history***

Production in the Gemsa Field started in 1910 (Lindquist, 1998a). In 1998 there were 120 oil fields and 12 gas fields in production (SPE, 1998).

#### ***Geographic distribution***

The Gulf of Suez (offshore), the Western Desert (in the northwest Egypt) and offshore areas north of the Nile Delta and Sinai are the most important regions for hydrocarbon reserves and production. Earlier some production has also taken place in the southern Egypt (Kulke, 1995).

### **ERITREA**

Exploration in Eritrea started in the 1960s (the Red Sea Basin). Exploration in the southern Eritrea and in the northeast in 1990s was not successful. No production has occurred (Mbendi, 2000; EIA, 2003; Andarko Petroleum Corporation, 2003).

### **ETHIOPIA**

#### ***Discovery history***

Although hydrocarbon exploration in Ethiopia started in 1920 in the Ogaden Basin, the first discovery was made in 1972 (the Calub gas field). Small hydrocarbon finds have been made in several regions (African Energy, 2001; Worku, 2001; Mbendi, 2000).

#### ***Production history***

By 2000 no production had taken place in Ethiopia. At the beginning 2000s the Calub gas field was under development (Mbendi, 2000).

#### ***Geographic distribution***

The Ogaden Basin has the largest potential in the country (Mbendi, 2000).

### **FRANCE**

First discovery	1498
First production year	1735
Oil production, 1999 (m.t)	1.7

Gas production, 2001 (bn.m <sup>3</sup> )	1.9
Oil reserves, 2001 (m.t)	21
Gas reserves, 2001 (bn.m <sup>3</sup> )	13

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(LoveToKnow, Corp., 2003; Laherrere, 2003; World Energy Council, 2001; CIA, 2003)

#### ***Discovery history***

The oldest oil field in France (Pechelbronn at the Rhine Graben in Alsace) has been known for centuries. Modern exploration started in the 1930s and in 1939 the St. Marcet Field was found in the Aquitaine Basin in the south-east France. This was followed by several discoveries in the same area during the next three decades. In the Paris Basin the search for petroleum succeeded in 1958 when the Coulommès, Chailly and Saint Martin de Bossenay fields were found. Further discoveries were made in the 1980s and 1990s (LoveToKnow, Corp., 2003; Kulke, 1994; Anonymous, 2001; Petroleum Economist, 2003).

#### ***Production history***

In France the first formal production took place in 1735 (the Pechelbronn Field). Production in the Aquitaine Basin started in 1954. Several fields have come online since the 1950s in the Aquitaine and Paris basins, but oil production has been decreasing since the beginning of the 1990s (Laherrere, 2003; Laherrere, 2001; Ministère de l'Économie, des Finances et de l'Industrie, 2002; Wendebourg et al., 2002; Kulke, 1994; World Energy Council, 2001).

#### ***Geographic distribution***

The majority of France's oil and gas are found in the Paris Basin in the central France and in the Aquitaine Basin in the south-east France. Oil and gas reserves of the Rhine Graben Basin in Alsace are mostly depleted (Pawlewicz et al., 2003; Petroleum Economist, 2003; World Energy Council, 2001; Kulke, 1994).

## **GABON**

First oil discovered	1956
First production year	1957
Oil production, 1999 (m.t)	17
Gas production, 2000 (bn.m <sup>3</sup> )	0.1
Oil reserves, 2001 (m.t)	342
Gas reserves, 2000 (bn.m <sup>3</sup> )	33.4

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001; Mbendi, 2001)

#### ***Discovery history***

Exploration in Gabon started in 1926, but the first oil was found in 1956 (the Ozouri Field). This was followed by several other discoveries; the first offshore field (Anguille) was discovered in 1962. The largest oilfield of the country, the Rabi-Kounga, was found in 1985. The region north of Port Gentil is considered to hold potential for oil and gas occurrences (Mbendi, 2001; Kulke, 1995; Petrel Robertson, 1995b).

#### ***Production history***

In Gabon oil production started in 1957 and in the years between 1968 and 1990 the major production fields were the Gamba Field and several offshore fields. In 2001 the Rabi-Kounga Field was producing 40% of the country's output. Gabon is the third largest producer in the Sub-Saharan Africa (Kulke, 1995; Mbendi, 2001; EIA, 2003).

#### **Geographic distribution**

Majority of Gabon's oil and gas is found in the Gabon Basin located on the coast in the central Gabon (both onshore and offshore fields) (Persits et al., 1997; Kulke, 1995).

## **GEORGIA**

First discovery	1930
First production year	1930
Oil production, 1999 (m.t)	0.1
Gas production, 1999 (bn.m <sup>3</sup> )	0.06
Oil reserves, 2001 (m.t)	4.8
Gas reserves, 2002 (bn.m <sup>3</sup> )	8.5

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(World Energy Council, 2001; NRMBSR, year unknown; EIA, 2002)

#### **Discovery history**

We were not able to find exact information about hydrocarbon exploration and discovery history in Georgia. Several oil and gas fields in the Kura Basin have been known at least since 1930 (therefore discovery year is set to 1930 in the dataset). In the Rioni Basin oil and gas fields were discovered in the 1970s (the discovery year is set to 1975 in the dataset) (World Energy Council, 2001; NRMBSR, year unknown).

#### **Production history**

The commercial oil production in Georgia started near Tbilisi in 1930. Production of gas started in 1997 (World Energy Council, 2001; NRMBSR, year unknown; EIA, 2002).

#### **Geographic distribution**

Majority of country's oil and gas is found in the Rioni Basin in the west Georgia (near the Black Sea coast) and in the Kura Basin in the south-east (World Energy Council, 2001; Adamia et al., year unknown).

## **GERMANY**

First discovery	Around 1880
First production year	1880
Oil production, 1999 (m.t)	2.7
Gas production, 1999 (bn.m <sup>3</sup> )	22.4
Oil reserves, 2001 (m.t)	42
Gas reserves, 2001 (bn.m <sup>3</sup> )	285

m.t = million tonnes



bn.m<sup>3</sup> = billion cubic meters  
(Kulke, 1994; World Energy Council, 2001)

### ***Discovery history***

In Germany the first field was found in 1880 at Wietze in the Northwest German Basin. In the Rhine Graben Basin the Forst-Weiher Field was discovered between 1934 and 1936.

Exploration succeeded in several finds in Middle and Northern Germany in the following years and the Ampfing Field in the Molasse Basin was discovered in 1954. The first offshore discovery was made in 1974 (the A6 Field) in the North Sea Graben and was followed by the Schwedeneck-See Field in the Baltic Sea in 1978. The search for oil and gas continued in the 1990s (Kulke, 1994; Pawlewicz et al., 2003; Petroleum Economist, 2003; Anonymous, 2001).

### ***Production history***

The first commercial oil production took place in 1880 and in 1930 the Volkenroda Field in the Middle Germany came on stream. In the northern part of the country the Lueben Field commenced production in 1959 and the first offshore field, the Schwedeneck-See Field, went online in 1984. The Mittelplate Field in the North Sea was put into production in 1987 and in 2000 the A6 Field followed. The production of oil and gas peaked in the mid 1960s and has been decreasing since (World Energy Council, 2001; Kulke, 1994; Krajewski et al., 2002; RWE Dea, year unknown; SPIEGEL ONLINE, 2001).

### ***Geographic distribution***

Majority of onshore oil and gas is found in the basins Northwest German, Rhine Graben (in the west) and Molasse (in the south). Offshore oil and gas is located in the North Sea Graben and the Northwest German Basin including the west coast of the Baltic Sea (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

## **GHANA**

First oil discovered	1977
First production year	1978
Oil production, 1999 (m.t)	0.3
Gas production	---
Oil reserves, 2001 (m.t)	2.3
Gas reserves	---

m.t = million tonnes  
(Anonymous, 2001; Mbendi, 2000)

### ***Discovery history***

The first oil discovery was the Saltpond Field in 1977, which was followed by the South Tano Field in 1978 and the North Tano Field in 1980. All discoveries have been made offshore (Anonymous, 2001; Mbendi, 2000).

### ***Production history***

The first formal production in Ghana is dated for 1978 but there is no further information about the location (Mbendi, 2000; 1Up Info, 1994).

### ***Geographic distribution***

All production occurs in the Tano and Saltpond basins. Basins Accra/Keta, Voltaian and Cape Three Points are considered to have hydrocarbon potential (Mbendi, 2000).

## GREECE

First discovery	1972
First production year	1981
Oil production, 1999 (m.t)	0.3
Gas production, 2001 (bn.m <sup>3</sup> )	0.035
Oil reserves, 2001 (m.t)	1.4
Gas reserves, 2001 (bn.m <sup>3</sup> )	0.25

m.t = million tonnes

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

### **Discovery history**

The first discovery was made in 1972 in the Aegean Sea (the Kavala Field). This was followed by the discovery of the nearby Prinos Field in 1974 and the offshore Epanomi Field in 1989, also in the Aegean Sea. Exploration in the Ioannina Block in the North Greece started in 1997 (Kulke, 1994; Woodruff, year unknown; Enterprise Oil plc, 1999; Petroleum Economist, 2003).

### **Production history**

The first commercial production took place in 1981 (Kavala and Prinos). The Kavala Field ceased production in 1993 and the Prinos Field five years later, but in 1996 the North Prinos Field came online. There are no other producing fields in the country, although the exploitation of the Epanomi Field was considered in 1999 (ICAP, year unknown; Anonymous, 1999; Kulke, 1994; World Energy Council, 2001).

### **Geographic distribution**

The Aegean Sea in the north-east and the Dinaric Alps, which are located along the west coast, are considered to have the largest potential in Greece (Pawlewicz et al., 2003; Petroleum Economist, 2003; Kulke, 1994).

## GUATEMALA

First discovery	1930s
First production year	Around 1976–79
Oil production, 1999 (m.t)	1.3
Gas production	---
Oil reserves, 2001 (m.t)	79
Gas reserves, 2001 (bn.m <sup>3</sup> )	1.5

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Bowles et al., year unknown; World Energy Council, 2001; CIA, 2003)

### **Discovery history**

In Guatemala the first oil was found in the 1930s but there is no information about the location. Modern exploration started in 1970 resulting in discovery of the Tortugas Field in the same year and the West Chinaja Field in 1977 in the central Guatemala. Several fields were found in the beginning of the 1980s in the same region. In the north the Xan and Chocop fields were discovered in 1985 (Bowles et al., year unknown; World Energy Council, 2001; Anonymous, 2001; Petroleum Economist, 2003).

#### ***Production history***

The first commercial production in Guatemala took place around 1976–79 but there is no information about the location. The Xan Field came on stream in 1985 and several fields in the north and central Guatemala are under production (World Energy Council, 2001; Bowles et al., year unknown; Petroleum Economist, 2003; Anonymous, 2001).

#### ***Geographic distribution***

The most important area for oil and gas occurrences is the Sierra Madre de Chiapas-Peten Foldbelt, which extends from the north to the south (Klett et al., 1997; Petroleum Economist Ltd, 2003).

### **GUYANA**

#### ***Discovery history***

Exploration in the whole Guyana Basin started in 1938 and in Guyana onshore wells were drilled in 1967, but without any significant result. The offshore search for oil and gas in the Guyana Basin was intensified between 1974 and 1978 and several oil and gas shows were found. In the Takutu Basin drilling started in 1981 and in 1982 the Karanambo well was found, but its reserves were uneconomic. Future exploration of the Takutu Basin was planned in 1998 (Kulke, 1995; DRAFT, 1996; Gurmendi, 1999).

#### ***Production history***

Until 2001 no oil or gas production has been reported from Guyana (CIA, 2003).

#### ***Geographic distribution***

The area with most potential for oil and gas occurrences is the Takutu Basin in the middle-western part of Guyana (Schenk et al., 1999; DRAFT, 1996).

### **HUNGARY**

First discovery	1937
First production year	1937
Oil production, 1999 (m.t)	1.8
Gas production, 2001 (bn.m <sup>3</sup> )	3.2
Oil reserves, 2001 (m.t)	8
Gas reserves, 2001 (bn.m <sup>3</sup> )	50

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; Hungarian Geological Survey, 2002; World Energy Council, 2001; CIA, 2003)

#### ***Discovery history***

Exploration in Hungary started in the mid-1920s. The first oil field was found in 1937 at Budafa in the western part of the country. It was followed by discovery of several fields in the same area. In 1954/56 the Demjen Field was discovered in the eastern Hungary. The giant Aglyoe Field in the south-east was found in 1965 and until the end of the 1990s a large number of discoveries were made all over the country (Kulke, 1994; MOL Plc., year unknown; Anonymous, 2001; Petroleum Economist, 2003).

#### ***Production history***

In Hungary the first formal production is reported from 1937 (the Budafa Field). The Szolnok Field commenced production in 1955 as the first field in the central and eastern part of the country. Oil production has steadily decreased since 1990. The Aglyoe Field alone represents 52% of the national output (Hungarian Geological Survey, 2002; MOL Plc., year unknown; Petroleum Economist, 2003; Kulke, 1994; World Energy Council, 2001aj).

#### ***Geographic distribution***

The most important areas for oil and gas potential in Hungary are the western and south-eastern parts of the Pannion Basin, which covers most of the country (Pawlewicz et al., 2003; Petroleum Economist Ltd, 2003; Kulke, 1994).

## **INDIA**

First discovery	1889
First production year	1890
Oil production, 1999 (m.t)	36.7
Gas production, 1999 (bn.m <sup>3</sup> )	19.5
Oil reserves, 2001 (m.t)	645
Gas reserves, 2001 (bn.m <sup>3</sup> )	647

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; GSPC, year unknown; World Energy Council, 2001)

#### ***Discovery history***

Exploration in India started in 1866, which succeeded in 1889 when the Digboi oil field was found in the Assam Basin. After independence in 1947 the search for oil and gas was intensified. In 1960 the first commercial discovery in the Bombay Basin was made, followed by the Bombay High Field in 1974, which was the first offshore discovery. In the Cauvery and Krishna-Godavari basins offshore discoveries were made in the 1980s and 90s (Kulke, 1994; HDCF Securities, 2000).

#### ***Production history***

The first formal production in India took place in 1890 (the Digboi Field). In the Bombay Basin production started in 1962 and after that several fields in different basins followed. The Bombay High Field came on stream in 1976 and in 1999 it accounted for 36% of total production in India. By 2005 the production of gas is expected to increase to 44 bn.m<sup>3</sup> (GSPC, year unknown; NOS, year unknown; World Oil, 1998; World Energy Council, 2001; Kulke, 1994).

#### ***Geographic distribution***

The most important regions in India for oil and gas occurrences are the onshore Assam Basin in the north-east, the Bombay Basin (both onshore and offshore) in the west and the basins Krishna-Godavari and Cauvery in the eastern India (Wandrey et al., 1999; Petroleum Economist, 2003; Kulke, 1994).

## INDONESIA

First discovery	1885
First production year	1885
Oil production, 1999 (m.t)	67.4
Gas production, 1999 (bn.m <sup>3</sup> )	66.4
Oil reserves, 2001 (m.t)	707
Gas reserves, 2001 (bn.m <sup>3</sup> )	2 212

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

### ***Discovery history***

In Indonesia exploration started in 1871 and the first commercial oil field was found in the North Sumatra Basin in 1885. Oil was discovered on Java in 1888, Kalimantan in 1898 and in the South Sumatra Basin in 1904 (CCOP, 2002d; Kulke, 1994; World Energy Council, 2001).

### ***Production history***

The first commercial oil production in Indonesia took place in 1885. In the East Java Basin the development of fields has been reported since 1888. Oil production increased substantially after 1960 and peaked in 1980. Gas production started in 1967 and it has increased strongly since 1975; Indonesia is one of the world's most important gas exporters (Kulke, 1994).

### ***Geographic distribution***

Majority of oil and gas are found in the basins on Sumatra, Java and Kalimantan. There are also some finds on Sulawesi and Irian Jaya Main production areas are located in the central Sumatra, northwest Java and east Kalimantan (Kulke, 1994; Steinshouer et al., 1999; World Energy Council, 2001; Petroleum Economist, 2003).

## IRAN

First discovery	1908
First production year	1911/12
Oil production, 1999 (m.t)	175.2
Gas production, 1999 (bn.m <sup>3</sup> )	53.0
Oil reserves, 2001 (m.t)	12 667
Gas reserves, 2001 (bn.m <sup>3</sup> )	24 308

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; ROOZBEHAN CO., year unknown; World Energy Council, 2001)

### ***Discovery history***

Oil and gas escapes on the surface had been known for centuries in Iran, but the first modern discovery was made in 1908 when the Masjed Soleyman Field was found in the Zagros Fold Belt. Through the years several oil and gas fields have been discovered in the region. In the 1960s exploration also succeeded in the south-western Iran and the first offshore discoveries in the Gulf of Persia were made (Kulke, 1994).

#### ***Production history***

The first commercial oil production in Iran is reported from the Masjed Soleyman Field in 1911/12 and the first oil was exported from Abadan in 1912. Gas production started in 1955. Iran is one of the most important hydrocarbon producers in the world and its reserves are huge (ROOZBEHAN CO., year unknown; World Energy Council, 2001).

#### ***Geographic distribution***

The most important offshore region for oil and gas occurrences is the Mesopotamian Foredeep Basin and for onshore reserves the most important region is the Zagros Fold Belt. Both areas are located along the Gulf of Persia in the west Iran (Pollastro et al., 1999b; Kulke, 1994; Petroleum Economist, 2003)

## **IRAQ**

First discovery	1901
First production year	1934
Oil production, 1999 (m.t)	125.8
Gas production, 1999 (bn.m <sup>3</sup> )	3.2
Oil reserves, 2001 (m.t)	15 141
Gas reserves, 2001 (bn.m <sup>3</sup> )	3 110

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(EIA, 2003; Vallette et al., 2003; World Energy Council, 2001)

#### ***Discovery history***

Due to known oil escapes on the surface since ancient times, exploration focused on Iraq already in the 19<sup>th</sup> century. Oil development started in 1901 when the Chia Surkh Field was found in the Zagros Fold Belt, followed by the Naft Khaneh Field in 1909 and the giant Kirkuk Field in 1927 in the same region. In 1949 the first oil fields in the Mesopotamian Foredeep Basin (Nahr Umr and Zubair) near Basrah were discovered. Since 1968 exploration has resulted in several discoveries (Kulke, 1994; EIA, 2003; Anonymous, 2001; Graham, 2002).

#### ***Production history***

The first commercial production in Iraq took place in 1934 (the Kirkuk Field). Gas production commenced in 1955. During and after the Gulf War in 1990/91 oil production was interrupted and first in 1999 Iraq reached the pre-war production level (Vallette et al., 2003; World Energy Council, 2001).

#### ***Geographic distribution***

The most important areas in Iraq for oil and gas occurrences are the Zagros Fold Belt and the Mesopotamian Foredeep Basin. Both are located in the eastern Iraq and together the basins

extend from the north to the south (Pollastro et al., 1999a; Petroleum Economist, 2003; Kulke, 1994).

## IRELAND

First discovery	1971
First production year	1978
Oil production	---
Gas production, 2001 (bn.m <sup>3</sup> )	0.8
Oil reserves	---
Gas reserves, 2001 (bn.m <sup>3</sup> )	9

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; IOOA, 2003; CIA, 2003)

### **Discovery history**

The search for oil and gas in Ireland began in the 1950s and in 1971 the offshore Kinsale Head field was found south of Cork. The offshore field Corrib north of Ireland was discovered in 1996 and the Connemara offshore field (north-west of Ireland) a year later (Kulke, 1994; Marathon Oil Corporation, 1999; Alexander's Gas & Oil Connections, 1997).

### **Production history**

In Ireland gas production started in 1978 (the Kinsale Head Field). The Corrib Field is planned to come on stream in 2005 (IOOA, 2003; Alexander's Gas & Oil Connections, 1999; Statoil, 2003).

### **Geographic distribution**

The most important areas for oil and gas potential in Ireland are the offshore regions north and south of the island (Pawlewicz et al., 2003; Petroleum Economist, 2003; Kulke, 1994).

## ISRAEL

First discovery	1955
First production year	1956
Oil production, 1999 (m.t)	0.004
Gas production	---
Oil reserves, 2001 (m.t)	0.5
Gas reserves, 2003 (bn.m <sup>3</sup> )	0.1

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; Anonymous, 2001; World Energy Council, 2001; EIA, 2003)

### **Discovery history**

Exploration in Israel started in 1947 and the first discovery was made in 1955 (the Heletz-Brur Field), followed by the Zohar Field in 1959. Offshore exploration resulted in several discoveries in the Levantine Basin in the late 1990s (Kulke, 1994; Anonymous, 2001; Arnold, 1999; Oil & Gas Journal, year unknown).

**Production history**

The first commercial production in Israel is reported for 1956 (the Heletz-Brur Field; there is no spatial information about the first formal production, but Heletz-Brur was the only discovery in 1956). The offshore fields were not producing by 2002 but development of the fields is planned (World Energy Council, 2001; Anonymous, 2001; BG Group PLC, 2002).

**Geographic distribution**

Israel's oil and gas fields are located in the central part of the country. Offshore resources occur in the Mediterranean Sea, near Gaza, in the south-east Israel (Pollastro et al., 1999a; Petroleum Economist, 2003; Oil & Gas Journal, year unknown).

**ITALY**

First discovery	1480
First production year	1861
Oil production, 1999 (m.t)	5.0
Gas production, 2001 (bn.m <sup>3</sup> )	15.4
Oil reserves, 2001 (m.t)	61
Gas reserves, 2001 (bn.m <sup>3</sup> )	209

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

**Discovery history**

Oil seeps at Mount Cibio near Modena have been known for centuries but the first modern discovery was made in 1902 when oil was found in Val d'Agri area in southern part of the country. In 1944 the Caviaga Field was discovered in the Po Basin in North Italy and in 1954 the Ragusa Field was found on Sicily. Offshore exploration succeeded in 1958 (the Gela Field near Sicily). This was followed by discoveries in the Po Basin (the Porto Garibaldi Field) in 1968 and in the Adriatic Sea (the Rospo Mare Field) in 1975 (Kulke, 1994; Colajacomo, year unknown; Pawlewicz et al., 2003; Anonymous, 2001; Petroleum Economist, 2003; Lindquist, 1999a).

**Production history**

The first formal production took place in 1861 but there is no information about the location. The Cornegliano Field in the Po Basin came on stream in 1952 and the first offshore field, the Gela Field, commenced production in 1961 (World Energy Council, 2001; Boll. Uff. Degli Idrocarburi E Della Geotermia, 2002; Tali et al., 2002; Shirley, 2000; Michelotti, 2004; European Investment Bank, 2002).

**Geographic distribution**

The most important onshore areas for oil and gas occurrences in Italy are the Po Basin in the north, and the Val d'Agri area and Sicily in the south. The offshore basins in the Adriatic Sea and around Sicily have a great potential (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).



**JAPAN**

First discovery	1883
First production year	1887
Oil production, 1999 (m.t)	0.6
Gas production	minimal
Oil reserves, 2001 (m.t)	8
Gas reserves, 2003 (bn.m <sup>3</sup> )	40

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; EIA, 2003)

**Discovery history**

In Japan the first oil field was discovered in 1883 in the Niigata Basin, followed by several other discoveries in the basin as well as in the Akita Basin. During the period 1956 – 1972 26 oil and gas fields were discovered on Hokkaido and Honshu islands and by 1976 nine offshore fields had been discovered. Since then only small discoveries have been made (Kulke, 1994).

**Production history**

The first formal production took place in 1887 (the Ishikari Field). After 1978 only small discoveries have been developed (Kulke, 1994).

**Geographic distribution**

The majority of Japan's oil and gas are found in the basins Niigata and Akita in the west-central Honshu and south Hokkaido, respectively. The southern Japan also has some potential (Kyushu island) (Kulke, 1994; Steinshouer et al., 1999).

**JORDAN**

First discovery	1984
First production year	1984/85
Oil production, 1999 (m.t)	0.002
Gas production, 2003 (bn.m <sup>3</sup> )	0.3
Oil reserves, 2001 (m.t)	0.12
Gas reserves, 2003 (bn.m <sup>3</sup> )	7

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Natural Resources Authority, 2001; World Energy Council, 2001; EIA, 2003)

**Discovery history**

Exploration in Jordan have taken place in intermittent intervals since 1938 and the first significant discovery was made in 1984 (the Hamzah oil field) at Azraq. Another important discovery is reported from 1987 when the Risha gas field was found (World Energy Council, 2001; Natural Resources Authority, 2001).

**Production history**

In Jordan oil production commenced in 1984 when the Hamzah Field started with a small-scale production; the first commercial production is reported from 1985. The Risha Field came on stream in 1989 and represents the only gas production in the country (World Energy Council, 2001; Natural resources Authority, 2001).

#### **Geographic distribution**

Oil and gas are found in Azraq and in the Wadi-Surhan Basin, both in the eastern Jordan (Pollastro et al., 1999a; Natural Resources Authority, 2001; Kulke, 1994).

### **KAZAKHSTAN**

First discovery	At least by 1911
First production year	1911
Oil production, 1999 (m.t)	30.1
Gas production, 1999 (bn.m <sup>3</sup> )	9.8
Oil reserves, 2001 (m.t)	742
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 841

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(World Energy Council, 2001)

#### **Discovery history**

We were not able to find exact information about when exploration in Kazakhstan started or when the first discoveries were made. For the Middle Caspian Basin exploration is reported from the beginning of the 1960s and the Uzen Field was found there in 1961. This was followed by the discoveries of giant fields Karachaganak and Tengiz in 1979, both in the North Caspian Basin. Intensive exploration is ongoing, especially for offshore fields in the Caspian Sea (Ulmishek, 2001b; BG Group, 2003; Anonymous, 2001; Petroleum Economist, 2003; Eni, 2003c).

#### **Production history**

The first formal oil production in Kazakhstan is reported for 1911 but there is no spatial information about the location. In the late 1960s several fields came on stream and in 1984 the Karachaganak Field started operating. Upstart of the giant Kashagan offshore field is planned to 2005 (World Energy Council, 2001; Ulmishek, 2001e; BG Group, 2003; EIA, 2003).

#### **Geographic distribution**

The most important region for oil and gas occurrences is the west Kazakhstan including the basins North Caspian, Middle Caspian and North Ustyurt (World Energy Council, 2001; Persits et al., 1998).

### **KUWAIT**

First discovery	1938
First production year	1946
Oil production, 1999 (m.t)	99.1 <sup>1</sup>

Gas production, 1999 (bn.m <sup>3</sup> )	8.1 <sup>1</sup>
Oil reserves, 2001 (m.t)	13 310 <sup>1</sup>
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 480 <sup>1</sup>

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

<sup>1</sup> including the share in the Neutral Zone between Kuwait and Saudi Arabia

(Kulke, 1994; Embassy of the State of Kuwait, 2000; World Energy Council, 2001)

#### **Discovery history**

The first discovery in Kuwait was made in 1938 when the giant Burgan Field in the Mesopotamian Foredeep Basin was found. In the 1950s several onshore fields were discovered. The discovery of the first offshore field in the Neutral Zone between Kuwait and Saudi Arabia is reported for 1960 (Kulke, 1994; Anonymous, 2001; AOC, year unknown).

#### **Production history**

In Kuwait the commercial production of oil started in 1946. Gas production started in 1960. The Gulf War in 1990/91 interrupted the production but normal level was reached in 1993 (Embassy of the State of Kuwait, 2000; World Energy Council, 2001).

#### **Geographic distribution**

Oil and gas are found practically in every part of the country, also offshore (Pollastro et al., 1999a; Petroleum Economist, 2003).

## **KYRGYZSTAN**

First discovery	1901
First production year	1969
Oil production, 1999 (m.t)	0.07
Gas production, 2000 (bn.m <sup>3</sup> )	0.03
Oil reserves, 2001 (m.t)	5.5
Gas reserves, 2001 (bn.m <sup>3</sup> )	4.9

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Anonymous, 2001; World Energy Council, 2001; INOGATE, 2003a)

#### **Discovery history**

We were not able to find comprehensive information about exploration or discovery history for Kyrgyzstan. In the Fergana Basin, which is shared between Kyrgyzstan, Uzbekistan and Tajikistan, first drilling is reported for 1880. The Maylisay Field in the Kyrgyzstan side was discovered in 1901. Since 1947 several fields have been discovered (Kulke, 1994; Anonymous, 2001).

#### **Production history**

The first formal production in Kyrgyzstan took place in 1969 when the Buhara gas well came on stream. Many fields are currently under development (INOGATE, 2003a).

#### **Geographic distribution**

Oil and gas are found in the Fergana Basin in the south-western part of the country (Persits et al., 1998).

**LATVIA**

Latvia's only oil field was discovered between 1960 and 1970 (discovery year assumed to be 1965 in the dataset) in the west near Liepaja. No commercial production has occurred in the country (Vdovykin, 2002; INOGATE, 2003e; Petroleum Economist, 2003).

**LIBYA**

First oil discovered	1956
First production year	1961
Oil production, 1991 (m.t)	67.0
Gas production, 1999 (bn.m <sup>3</sup> )	6.1
Oil reserves, 1992 (m.t)	3 892
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 313

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; 1Up Info, 2003; World Energy Council, 2001)

**Discovery history**

The first discovery was made in the Fezzan Uplift in 1956. This was followed by the discovery of the Nasser Field in 1961. Several large discoveries have been made since then (1Up Info, 2003; Kulke, 1995).

**Production history**

The oil production started in 1961 (the Nasser Field). (EIA, 2003; Kulke, 1995).

**Geographic distribution**

Majority of oil and gas is found in the basins Sirte, Ghadames and Murzuk, and in the offshore areas in the Pelagian Sea (Persits et al, 1997; Kulke, 1995).

**LITHUANIA**

First discovery	1960 - 1970
First production year	1990
Oil production, 1999 (m.t)	0.2
Gas production	---
Oil reserves, 2001 (m.t)	1.6
Gas reserves	---

m.t = million tonnes

(Vdovykin, 2002; World Energy Council, 2001)

**Discovery history**

In Lithuania several oil fields were discovered between 1960 and 1970 in the Kaliningrad region (discovery year assumed to be 1965 in the dataset) (Vdovykin, 2002).

**Production history**

Small-scale oil production in Lithuania started in 1990. (EIA, 2002).

**Geographic distribution**

Oil occurs both onshore and offshore in the Baltic Depression in the eastern part of the country (Petroleum Economist, 2003; Persits et al., 1998).

**MACEDONIA**

U.S. Geological Survey reports that Macedonia has one oilfield located in the central part of the country. No production. (Pawlewicz et al., 2003; Worldinformation.com\_1, year unknown).

**MADAGASCAR****Discovery history**

Exploration started in the beginning of the 20<sup>th</sup> century and the first discoveries were made before 1939 (the Bemolanga and Tsimiroro gas fields). Exploration continued in the Majunga and Morondava basins and in 1955 gas shows were found at Sikily. By 1993 several gas shows had been found in the two basins (the Manambolo gas Field in 1987) (Mbendi, 2000).

**Production history**

By 2000 no production had occurred, but the development of the gas fields Bemolanga, Tsimiroro and Manambolo was planned (Mbendi, 2000).

**Geographic distribution**

In Madagascar oil and gas occur in the Morondava Basin in the south-west and in the Majunga Basin in the north-west (Persits et al., 1997; Mbendi, 2000; Jebco Seismic (UK) Limited, 2001).

**MALAYSIA**

First discovery	1910
First production year	1913
Oil production, 1999 (m.t)	35.7
Gas production, 1999 (bn.m <sup>3</sup> )	41.1
Oil reserves, 2001 (m.t)	513
Gas reserves, 2001 (bn.m <sup>3</sup> )	2 313

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

**Discovery history**

On Sarawak and Sabah oil seeps have been known for centuries and the first, and so far the only, commercial onshore discovery was made there in the Baram Delta (the Miri Field) in 1910. In 1954 offshore exploration started and the first discovery in the same region was made in 1963. First discovery in the Malay Basin (east of the Malay Peninsula) was made in 1971. Since then several offshore discoveries have been made (Kulke, 1994; World Energy Council, 2001; Anonymous, 2001; Petroleum Economist, 2003).

**Production history**

The first commercial production in Malaysia took place in 1913 (the Miri oil field). We were not able to date when production from offshore fields started but in Sarawak and Sabah there has been production at least since 1988 (World Energy Council, 2001; Kulke, 1994; Malaysia Information, 2003).

**Geographic distribution**

Oil and gas are found in the Sarawak and Sabah basins, both located on the north Borneo, and in the Malay Basin east of the Malay Peninsula (Kulke, 1994; Malaysia Information, 2003; Petroleum Economist, 2003).

**MEXICO**

First discovery	1869
First production year	1901
Oil production, 1999 (m.t)	166.1
Gas production, 1999 (bn.m <sup>3</sup> )	34.8
Oil reserves, 2001 (m.t)	3 858
Gas reserves, 2001 (bn.m <sup>3</sup> )	861

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

**Discovery history**

The first commercial discovery was made in 1869 near Furbero. In the Tampico-Misantla Basin (north-east of Mexico City, near the Gulf of Mexico) the Ebano and Panuco fields were discovered in 1901. In the southern Mexico the Tonaia-El Burro Field was discovered in 1928 and in the northeast the Reynosa Field in 1948. The first offshore discoveries were made in 1966 (the Arenque and Bagre fields in the Tampico-Misantla Basin) (Kulke, 1995; Earth Sciences and Resources Institute, 1995; Petroleum Economist, 2003; Klett et al., 1997; Anonymous, 2001).

**Production history**

In Mexico the first formal oil production took place in 1901 (the location unknown); in the Tampico-Misantla Basin production started in the early 20<sup>th</sup> century. In the Saline-Comalcalco Basin in the southern part of the country the first fields came on stream in 1905 and the Reynosa Field went online in 1948. Offshore production started in the late 1960s (the Tampico-Misantla Basin) (World Energy Council, 2001; Kulke, 1995; Klett et al., 1997; Offshore Magazine, 1994; Baker20 et al., 1996).

**Geographic distribution**

The most important areas in Mexico for oil and gas occurrences are the Tampico-Misantla Basin north-east of Mexico City and the basins in the south-east (Earth Sciences and Resources Institute, 1995; Klett et al., 1997; Petroleum Economist, 2003; Kulke, 1995).

**MOLDOVA****Discovery history**

We found little information about when hydrocarbon exploration started in Moldova or when the first discoveries were made. The Valen oil field was discovered in 1957 in the Carpathian-Balkanian Basin and the Viktorov gas field in the Dobrogea Foreland in 1963. There are several oil and gas shows in the southern part of the country but there has not been systematic effort to explore the region (INOGATE, 2003b).

#### ***Production history***

By 2002 there had been no commercial production in Moldova (EIA, 2002; INOGATE, 2003b).

#### ***Geographic distribution***

In Moldova the most important area for oil and gas occurrence is the southern part of the country (basins Dobrogea Foreland and Carpathian-Balkanian) (Persits et al., 1998; INOGATE, 2003b; Petroleum Economist, 2003).

### **MONGOLIA**

Exploration in Mongolia started in 1940 resulting in the discovery of the Zuunbayan Field (year unknown). The Zuunbayan Field produced oil in the 1950s and 1960s. All oil in Mongolia occurs in the Gobi Basin in the south-western part of the country (south of Ullan Bator, near the frontier to China) (Kulke, 1994; 1Up Info, 1989b; Steinshouer et al., 1999).

### **MOROCCO**

First oil discovered	1923
First production year	1932
Oil production, 1994 (m.t)	8
Gas production, 1994 (bn.m <sup>3</sup> )	0.025
Oil reserves, 2000 (m.t)	60
Gas reserves, 2000 (bn.m <sup>3</sup> )	1.0

m.t = million tonnes

bn.m<sup>3</sup> = million cubic meters

(ONAREP\_b, unknown; Mbendi, 2000; World Energy Council, 2001)

#### ***Discovery history***

Onshore exploration started in 1929 and offshore exploration in the 1960s (Kulke, 1995; Mbendi, 2000, EIA, 2003).

#### ***Production history***

The first formal production in Morocco took place in 1932 and there is information about production at the Djebel Tselfat and Bou-Draa fields before 1938. Morocco produces only a fraction of its oil consumption (World Energy Council, 2001; Ball, 1940; Mbendi, 2000).

#### ***Geographic distribution***

In Morocco oil and gas occurs in the Essaouni Basin (near city Agadir) and in the Aaiun-Tarfaya Basin (in West-Sahara) (Persits et al., 1997).

**MOZAMBIQUE*****Discovery history***

Exploration started in 1948 and the first gas discovery (the Temane Field) was made in 1957. It was followed by the discovery of the gas fields Pande (1961) and Buzi (1962). In 1999 there were plans to explore the Sofala-Sengo Marine and the M-10 blocks. There is also exploration in the Rovuma Basin and in the Zambezi River delta (Kulke, 1995; Mbendi, 2001)

***Production history***

Up to the year 2001 no commercial hydrocarbon production has taken place in Mozambique (Mbendi, 2001).

***Geographic distribution***

Sofala Province in the central Mozambique is thought have the largest potential for hydrocarbon occurrences (Mbendi, 2001).

**MYANMAR (BURMA)**

First discovery	1864
First production year	1889
Oil production, 1999 (m.t)	0.4
Gas production, 1999 (bn.m <sup>3</sup> )	1.7
Oil reserves, 2001 (m.t)	6.8
Gas reserves, 2001 (bn.m <sup>3</sup> )	283

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Wandrey et al., 2000; World Energy Council, 2001)

***Discovery history***

In Myanmar the first commercial discovery was made in 1864 (the Yenangyat Field in the Irrawaddy Basin). The systematic exploration for oil and gas started in 1886 and several fields were found, mainly in the Irrawaddy Basin, throughout the years. In the 1990s discoveries were made both onshore and offshore (Wandrey et al., 2000; Kulke, 1994; Yangan City, year unknown).

***Production history***

The first formal production in Myanmar took place in 1889 but there is no information about the location. Almost all drilling-facilities were destroyed in the World War II and for a long time production mainly come from the Mann Field. In the 1990s production started in several fields and production is expected to increase (World Energy Council, 2001; Kulke, 1994).

***Geographic distribution***

Majority of oil and gas is found in the Irrawaddy Basin both onshore and offshore. The Basin extends from the north to the south (the Irrawaddy River) (Wandrey et al., 1999; Petroleum Economist, 2003).



**NAMIBIA*****Discovery history***

In Namibia offshore exploration started in 1968 and the offshore gas field Kudu was discovered in 1973. After independence some further exploration has taken place; without any significant results (Mbendi, 2000).

***Production history***

Until 2000 no production had occurred in Namibia. The Kudu gas field was planned to start production in 2004/5 (Mbendi, 2000; Moyo, 1999).

***Geographic distribution***

The Kudu Field is the only significant discovery. The field is located in the south-west (Persits et al., 1997; Mbendi, 2000).

**NETHERLANDS**

First discovery	1943
First production year	1943
Oil production, 1999 (m.t)	2.6
Gas production, 2001 (bn.m <sup>3</sup> )	70.3
Oil reserves, 2001 (m.t)	13
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 714

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

***Discovery history***

Exploration started in 1935 and in 1943 the giant oil field Schoonebeek was discovered in the Northwest German Basin. Several onshore discoveries were made in the 1950s and 1960s and the first offshore field was found in 1968 (the Halfweg Field in the Anglo-Dutch Basin) (Kulke, 1994; Pawlewicz et al., 2003; Ministerie van Economische Zaken, 2002; UNOCAL, 2001a; UNOCAL, 2001b; Anonymous, 2001).

***Production history***

In the Netherlands the first commercial oil production took place in 1943 (most likely the Schoonebeek Field). In 1972 the offshore A18 Field commenced production, followed by other fields in the 1970s and 1980s. Gas and oil production has declined over the last years (Kulke, 1994; World Energy Council, 2001; Ministerie van Economische Zaken, 2002; UNOCAL, 2001b; Lundin, 2004a).

***Geographic distribution***

Majority of onshore oil and gas is located in the Northwest German Basin in the north-east and the Anglo-Dutch Basin in the west. The Dutch sector of the North Sea has several fields (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

**NEW ZEALAND**

First discovery	1865
First production year	1906
Oil production, 1999 (m.t)	2.0
Gas production, 1999 (bn.m <sup>3</sup> )	5.8
Oil reserves, 2001 (m.t)	14
Gas reserves, 2001 (bn.m <sup>3</sup> )	68

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(New Zealand Petroleum, 2002; World Energy Council, 2001)

**Discovery history**

Exploration in New Zealand started in 1865 when the first well was drilled in the Taranaki Basin (the Moturoa Field was discovered the same year). The Kapuni Field was discovered in 1959. The first offshore Field was discovered in 1969 (the Maui Field). Onshore and offshore exploration was ongoing in 2003 (New Zealand Petroleum, 2002; New Zealand Petroleum, 2001; New Zealand Petroleum, 2003c).

**Production history**

The first commercial production in New Zealand took place in 1906 (the Moturoa Field). Several onshore and offshore fields in the Taranaki Basin have started production since 1970 (New Zealand Petroleum, 2002).

**Geographic distribution**

Majority of oil and gas occurs in the Taranaki Basin on the North Island, but the basins Great South and New Zealand Orogenic Belt also have potential (Steinshouer et al., 1999).

**NIGER**

Exploration in Niger started in the 1950s. There were some finds in the Agadem Basin (north of Lake Chad) in the 1970s (we have assumed a discovery of a field for 1975 in the dataset). Also the Djado Basin (in north-eastern Niger) has potential. By 2004 Niger had not produced oil or gas (Mbendi, 2000).

**NIGERIA**

First oil discovered	1956
First production year	1958
Oil production, 1999 (m.t)	98.1
Gas production, 1999 (bn.m <sup>3</sup> )	7
Oil reserves, 2001 (m.t)	3 000
Gas reserves, 2001 (bn.m <sup>3</sup> )	3 515

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic metres

(Mbendi, 2000; World Energy Council, 2001)

**Discovery history**

The first oil in Nigeria was found in the Niger Delta in 1956 (the Oloibiri Field). Thereafter the exploration has been intensive and discoveries numerous in the Delta area (Mbendi, 2000).

**Production history**

The formal production in Nigeria started in 1958. Over 90% of Nigeria's export revenues come from oil exportation (Mbendi 2000o; EIA, 2003).

**Geographic distribution**

The majority of oil and gas is found in the Niger Delta. Oil and gas are also found in the basins Anambra, Chad, Benin and Benue Trough (Mbendi, 2000).

**NORTH KOREA**

In North Korea the onshore exploration started in 1964 and offshore 1976 but no significant discovery has been reported. No production has occurred. The Yellow Sea is considered to have the largest potential for hydrocarbon occurrences (Kulke, 1994; EIA; 2002g; CCOP, 2002i).

**NORWAY**

First discovery	1969
First production year	1971
Oil production, 1999 (m.t)	148.7
Gas production, 1999 (bn.m <sup>3</sup> )	51.6
Oil reserves, 2001 (m.t)	1 510
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 245

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

**Discovery history**

Exploration in Norway started in 1965 in the North Sea. Fields Cod and Ekofisk were discovered in 1969 in the North Sea Graben. They were followed by several discoveries in the same basin during the next years. In 1982 discoveries were made in Vestford-Helgeland (the Tyrihans and Midgard fields), where also the giant Ormen Lange Field (1997) is located. The search for oil and gas in the Barents Sea (in the north) resulted in the discovery of the Askeladd Field 1981 (Kulke, 1994; Pawlewicz et al., 2003; Petroleum Economist, 2003; Norwegian Petroleum Directorate, 1999; Smith, year unknown) .

**Production history**

In Norway the first commercial oil production took place in 1971 when the Ekofisk Field was put into production. Several fields in the same area commenced production in the 1970s and 1980s, in 1993 the Draugen Field in Vestford-Helgeland came on stream and three years later the Yme, Yme Gamma, Beta East and Beta West in the Horda-Norwegian-Danish Basin went online. The fields in the Barents Sea were still undeveloped in 2003 and production is planned

for 2006 for the Snøhvit, Askeladd and Albatross fields. Over 90% of all production were exported in 1999 (Kulke, 1994; Norwegian Petroleum Directorate, 1999; Pawlewicz et al., 2003; Petroleum Economist, 2003; Norsk Hydro, 1999; Statoil, 2004; World Oil, 2004; World Energy Council, 2001).

### **Geographic distribution**

All oil and gas are located offshore in the North Sea and the Barents Sea (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

## **OMAN**

First discovery	1956
First production year	1967
Oil production, 1999 (m.t)	45.3
Gas production, 1999 (bn.m <sup>3</sup> )	5.6
Oil reserves, 2001 (m.t)	737
Gas reserves, 2001 (bn.m <sup>3</sup> )	805

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Oil & Gas Directory, 2003b; Kulke, 1994; U.S. Department of State, 2003; World Energy Council, 2001)

### **Discovery history**

Although oil was found in 1956 at Fahud, the first commercial discovery in Oman was made in 1963/64 in the same area (the Fahud Field). Since then exploration has resulted in numerous discoveries in many parts of the country. The offshore field Bukha was found in 1979 (Kulke, 1994; Oil & Gas Directory, 2003b; Anonymous, 2001).

### **Production history**

In Oman the first commercial production of oil took place in 1967 (the Fahud Field). Since then oil production has steadily increased. Gas production commenced in 1978 (U.S. Department of State, 2003; Kulke, 1994; World Energy Council, 2001).

### **Geographic distribution**

The most important areas for oil and gas occurrences in Oman are the Fahud, the Ghaba and the South Oman Salt basins which extend from the northwest over the Central Platform and the East Flank to the south. Nearly all hydrocarbon reserves are located onshore (Kulke, 1994; Pollastro et al., 1999a; Petroleum Economist, 2003).

## **PAKISTAN**

First discovery	1915
First production year	1922
Oil production, 1999 (m.t)	2.8
Gas production, 1999 (bn.m <sup>3</sup> )	22.0
Oil reserves, 2001 (m.t)	33

Gas reserves, 2001 (bn.m <sup>3</sup> )	581
---	-----

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kureshy, 1976; World Energy Council, 2001)

### ***Discovery history***

The first exploration well was drilled in 1866 in the Potwar Basin and during the period 1912 – 1947 several fields were discovered in the area. In 1952 the first gas field in the Indus Basin (the Sui Field) was found. Small discoveries were made in the Potwar Basin in 1968, but no discoveries were made in the 1970s. In 1981 the Khaskeli Field was discovered in the Indus Basin. Offshore exploration has not resulted in discoveries (Kulke, 1994; PAPG, year unknown).

### ***Production history***

In Pakistan the first formal oil production took place in 1922 when the Khaur Field in the Kohat-Potwar Basin went on stream. Gas production commenced in 1955 (the Sui Field). In 1999 Pakistan had at least 70 producing oil and gas fields (Kureshy, 1976; MPNR\_1; World Energy Council, 2001).

### ***Geographic distribution***

Majority of oil and gas is located in the basins Kohat-Potwar and Sulaiman-Kirthar in the North- and Central-Pakistan. Also the Indus Basin, which extends from the central Pakistan to south, is important (Wandrey et al., 1999; Wandrey et al., 2000; Kulke, 1994; Petroleum Economist, 2003).

## **PAPUA NEW GUINEA**

First discovery	1956
First production year	1991
Oil production, 1999 (m.t)	4.1
Gas production, 1999 (bn.m <sup>3</sup> )	0.1
Oil reserves, 2001 (m.t)	43
Gas reserves, 2001 (bn.m <sup>3</sup> )	428

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Petroleum Division, 2002; World Energy Council, 2001)

### ***Discovery history***

Exploration in Papua New Guinea started in 1913 and in 1956 the Kuru Field was found. The first offshore field, Uramu, was discovered in 1968. Since then several discoveries have been made (CCOP, 2002f; Petroleum Division, 2002; Petroleum Economist, 2003).

### ***Production history***

Commercial gas production in Papua New Guinea began in 1991 when the Hides gas field came on stream and the first oil production took place in 1992 when the Iagifu/Hedinia and Agogo fields started operating. By 2002 there had not been production offshore but the Uramu Field is under development (World Energy Council, 2001; CCOP, 2002f).

### ***Geographic distribution***

Oil and gas occurs in the Papuan Basin (both onshore and offshore) and in the onshore basins New Guinea Foreland and Fold Belt, all located in the western part of the country (Steinshouer et al., 1999; Petroleum Economist, 2003).

## PERU

First discovery	1868/69
First production year	1883
Oil production, 1999 (m.t)	5.3
Gas production, 1999 (bn.m <sup>3</sup> )	0.4
Oil reserves, 2001 (m.t)	48
Gas reserves, 2001 (bn.m <sup>3</sup> )	255

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

### **Discovery history**

In 1868/69 exploration succeeded in the first oil discovery in Peru, and in the whole South America, when the Talara Field was found in the north-western Peru. In the early 20<sup>th</sup> century several discoveries were made in the same coastal region. The first discovery in the Ucayali Basin is reported for 1939 (the Agua Caliente Field). The first offshore field was discovered in 1955 (the Litoral Field in the Talara Basin). In 1971 the Corrientes Field was discovered in the Marañon region. No significant discoveries have been made since 1986 (Kulke, 1995; Schenk et al., 1999; Petroleum Economist, 2003; Anonymous, 2001; EIA, 2003).

### **Production history**

In Peru the first commercial oil production took place in 1883 (the Talara Basin). Offshore production in same basin started in 1960. Fields in the Putumayo-Orient-Marañon Basin started to operate in 1975. Since the mid 1990s several fields in the Ucayali Basin have come on stream (World Energy Council, 2001; Schenk et al., 1999; Petroleum Economist, 2003; Occidental Petroleum Corporation, 2003; Maple, 2001; EIA, 2003; ENVOI, 2003).

### **Geographic distribution**

Majority of oil and gas is found in the Talara Basin in the north-west and in the Putumayo-Orient-Marañon and Ucayali basins in the north and central Peru. Some reserves are also located in the southern Peru (Schenk et al., 1999; Petroleum Economist, 2003; Kulke, 1995).

## PHILIPPINES

First discovery	1896
First production year	1979
Oil production, 1999 (m.t)	0.04
Gas production	---
Oil reserves, 2001 (m.t)	43
Gas reserves, 2001 (bn.m <sup>3</sup> )	108

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters  
(Kulke, 1994; EIA, 2003; World Energy Council, 2001)

#### ***Discovery history***

The Toledo oil Field was found on Cebu in 1896, but the first commercial discovery, the offshore field Nido, was made in 1976 (Kulke, 1994; CCOP, 2002g; Petroleum Economist, 2003; EIA, 2003; San Roque Dam project, 2001).

#### ***Production history***

Commercial oil production in the Philippines started in 1979 when the Nido Field went on stream. The San Antonio gas field has been producing for local consumption since 1994 and the giant Malampaya gas field started operating in 2002 (Kulke, 1994; World Energy Council, 2001; CCOP, 2002g).

#### ***Geographic distribution***

Majority of oil and gas is located in the offshore area Palawan in the South China Sea. The Visayan Basin (onshore and offshore) in the central Philippines has good potential (Kulke, 1994; World Energy Council, 2001; Petroleum Economist, 2003).

## **POLAND**

First discovery	1848
First production year	1874
Oil production, 1999 (m.t)	0.4
Gas production, 2001 (bn.m <sup>3</sup> )	5
Oil reserves, 2001 (m.t)	14
Gas reserves, 2001 (bn.m <sup>3</sup> )	154

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

#### ***Discovery history***

In Poland the first discovery was made in 1848 when the Wankowa Field was found in the North Carpathian Basin in the south. In the German-Polish Basin the Rybaki Field was discovered in 1961. Offshore exploration in the Baltic Sea succeeded in 1981 (the B3 Field in the Baltic Depression) (Kulke, 1994; Anonymous, 2001; Pawlewicz et al., 2003; PNIG NAFTA Pila, 2003; Petroleum Economist, 2003).

#### ***Production history***

The first formal production in Poland is reported for 1874 but there is no information about the location. In the 1930s several fields in the North Carpathian Basin were under production and between 1963 and 1965 fields in the German-Polish Basin started production. The first offshore production took place in 1992 when the B3 Field came on stream (World Energy Council, 2001; Pawlewicz et al., 2003; Nafta Gaz Sanok, year unknown; Stainless Steel World, 2003).

#### ***Geographic distribution***

The most important areas for oil and gas occurrences in Poland are the German-Polish Basin in the west-central Poland and the North Carpathian Basin in the south. (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

## **QATAR**

First discovery	1939
First production year	1949
Oil production, 1999 (m.t)	33.9
Gas production, 1999 (bn.m <sup>3</sup> )	24.0
Oil reserves, 2001 (m.t)	600
Gas reserves, 2001 (bn.m <sup>3</sup> )	10 900

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

### ***Discovery history***

In Qatar the first oil discovery was the onshore Dukhan Field in 1939. This was followed by several offshore discoveries in the 1960s and 1970s. The North Field (offshore), one of the world's largest gas fields, was discovered in 1971. (Kulke, 1994; World Energy Council, 2001; Anonymous, 2001).

### ***Production history***

The first formal production in Qatar took place in 1949 when the Dukhan Field started operating. The first offshore field to come on stream was Idd El Shargi in 1964. The North Field commenced production in 1991 (Kulke, 1994; Brooks et al., 1997; World Energy Council, 2001).

### ***Geographic distribution***

Majority of oil and gas is located in the offshore areas (in the north and east of the Qatar Peninsula) (Pollastro et al., 1999a; Petroleum Economist, 2003).

## **ROMANIA**

First discovery	At least by 1857
First production year	1857
Oil production, 1999 (m.t)	6.4
Gas production, 2001 (bn.m <sup>3</sup> )	14.2
Oil reserves, 2001 (m.t)	108
Gas reserves, 2001 (bn.m <sup>3</sup> )	406

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

### ***Discovery history***



Modern exploration in Romania started in the beginning of the 20<sup>th</sup> century, although oil production had started already in 1857. The first significant gas discovery was made in 1909 in Transylvania and in 1956 oil was found in southern Romania. In the Pannonian Basin in the western part of the country the Turnu oil field was discovered in 1963. First offshore field was discovered in the 1980s in the Black Sea (Kulke, 1994; San Joaquin Geological Society, 2002; S.N.P. PETROM S.A., 2004; USI ROMANIA, 2001; Pawlewicz et al., 2003).

#### ***Production history***

In Romania the first commercial oil production is reported for 1857 at Bend, northeast of Bucharest in the Carpathian-Balkanian Basin. Gas production started in 1909, had its peak in 1986 and has steadily decreased since. Offshore production started in 1987 (the Lebada oil field) (Kulke, 1994; San Joaquin Geological Society, 2002; World Energy Council, 2001; S.N.P. PETROM S.A., 2004; Pawlewicz et al., 2003).

#### ***Geographic distribution***

Majority of oil and gas is found in the Carpathian-Balkanian Basin in the eastern and southern part of Romania, in the Black Sea and Transylvania (Pawlewicz et al., 2003; Petroleum Economist, 2003; Kulke, 1994; World Energy Council, 2001).

## **RUSSIA**

First discovery	1595
First production year	1893
Oil production, 1999 (m.t)	304.8
Gas production, 1999 (bn.m <sup>3</sup> )	589.7
Oil reserves, 2001 (m.t)	6 654
Gas reserves, 2001 (bn.m <sup>3</sup> )	47 730

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Lindquist, 1999b; Ulmishek, 2001b; World Energy Council, 2001)

#### ***Discovery history***

Exploration in Russia started in the 19<sup>th</sup> century although oil had been found already in 1595 in the Timan-Pechora Basin. The first exploration well was drilled in 1864 in the Azov-Kuban Basin on the Taman peninsula and the first commercial discovery was made in 1899 in the Middle Caspian Basin. After the Second World War exploration moved further east to the Volga-Ural and the West Siberian basins. The search for offshore fields started in the beginning of the 1970s and one of the first fields discovered was the Okruzhnoye Field in the North Sakhalin Basin in 1972 (Lindquist, 1999b; Kulke, 1995; Ulmishek, 2001b; World Energy Council, 2001).

#### ***Production history***

The first production took place in 1893 when the first producing well was drilled in the Middle Caspian Basin (the Starogroznen Field). In the North Sakhalin Basin some fields came on stream in the 1920s and after World War II production increased due to new discoveries in the eastern part of Russia. In 1999 Russia was world's largest natural gas exporter and its oil production was increasing (Ulmishek, 2001b; Kulke, 1995; World Energy Council, 2001).

#### ***Geographic distribution***

The most important area for gas occurrences in Russia is western Siberia where 77% of the reserves are located. Other important regions for hydrocarbon production are the basins Volga-Ural, North and Middle Caspian, Azov-Kuban and Timan-Pechora basins (World Energy Council, 2001; Persits et al., 1998; Petroleum Economist, 2003).

## SAUDI ARABIA

First discovery	1938
First production year	1938
Oil production, 1999 (m.t)	409,6 <sup>1</sup>
Gas production, 1999 (bn.m <sup>3</sup> )	46,2 <sup>1</sup>
Oil reserves, 2001 (m.t)	35 983 <sup>1</sup>
Gas reserves, 2001 (bn.m <sup>3</sup> )	5 777 <sup>1</sup>

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

<sup>1</sup> including the share in the Neutral Zone between Kuwait and Saudi Arabia

(Ministry Of Petroleum & Mineral Resources, year unknown; Kulke, 1994; World Energy Council, 2001)

### **Discovery history**

The first discovery was made in 1938 (the Damman Field), which was followed by a series of discoveries in the Gulf of Persia and eastern Saudi Arabia. In 1948 world's largest oil field, Ghawar, was discovered and in 1951 the giant offshore field, Safaniyah, was found. Since 1989 oil and gas have also been found in the Interior Homocline-Central Arch which lies south of Riyadh (Kulke, 1994; Ministry Of Petroleum & Mineral Resources, year unknown; World Energy Council, 2001; Pollastro et al., 1999a).

### **Production history**

The first production in Saudi Arabia took place in 1938 when the Damman Field went on stream, although large-scale production from that field first started in 1945. Gas production started in 1961 (Kulke, 1994; Ivanhoe, 2001; World Energy Council, 2001; EIA, 2003).

### **Geographic distribution**

Majority of oil and gas is found in the eastern part of the country both onshore and offshore. Interior Homocline-Central Arch in the east central Saudi Arabia (south of Riyadh) has considerable reserves (Pollastro et al., 1999a; Petroleum Economist, 2003; Kulke, 1994).

## SENEGAL

First oil discovered	1955 - 1962
First production year	1995
Oil production	---
Gas production	---
Oil reserves, 2001	minimal
Gas reserves	---

(Mbendi, 2001; World Energy Council, 2001)

**Discovery history**

The first discovery was made during the period 1955 – 1962 (assumed to be 1960 in the dataset). Since 1993 Senegal has collaborated with Guinea-Bissau to explore the region (Mbendi, 2001).

**Production history**

Small scale production started in 1995. No further information was available (World Energy Council, 2001).

**Geographic distribution**

The Dakar Peninsula and Casamance offshore area have some potential for hydrocarbon reserves (Mbendi, 2001).

**SERBIA and MONTENEGRO**

First discovery	1949
First production year	1952
Oil production, 1999 (m.t)	0.010
Gas production, 2001 (bn.m <sup>3</sup> )	0.6
Oil reserves, 2001 (m.t)	0.7
Gas reserves, 2001 (bn.m <sup>3</sup> )	24.07

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Marcon International, Inc., 2003; Francuski et al., 2003; World Energy Council, 2001; CIA, 2003)

**Discovery history**

The first discovery was made in 1949 (location unknown). In 1952 the Jermenovci Field was found in the Pannonian Basin. Several discoveries were made during the next three decades and a huge oil-shale deposit was found at Aleksinac, near the city of Nis (Marcon International, Inc., 2003; Anonymous, 2001; Dimitrijevic, year unknown; Petroleum Economist, 2003).

**Production history**

For Serbia and Montenegro the first formal gas production is reported for 1952 when the Velika Greda Field came on stream. Oil production commenced four years later in 1956 with the Jermenovci Field going online. Production of oil has steadily decreased during the last years (Francuski et al., 2003; World Energy Council, 2001).

**Geographic distribution**

Majority of oil and gas is found in the Pannonian Basin in the north (Pawlewicz et al., 2003; Petroleum Economist, 2003; World Energy Council, 2001bq).

**SLOVAKIA**

First discovery	1914
First production year	At least by 1960

Oil production, 1999 (m.t)	0.07
Gas production, 2001 (bn.m <sup>3</sup> )	0.3
Oil reserves, 2001 (m.t)	1.3
Gas reserves, 2001 (bn.m <sup>3</sup> )	7.5

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

#### ***Discovery history***

In the second half of the 19<sup>th</sup> century exploration commenced in Former Czechoslovakia and in 1914 the first field was discovered in Bohemia. The region around Milakov in north-eastern Slovakia was still under exploration in 2002 (Kulke, 1994; Pawlewicz et al., 2003; Carpathian Resources Ltd, 2002).

#### ***Production history***

In Former Czechoslovakia gas production peaked in 1960. Four fields in Slovakia were producing in 2001 but the production volume was low and decreasing (Kulke, 1994; EuroGas Inc., 1996a; World Energy Council, 2001).

#### ***Geographic distribution***

Oil and gas in Slovakia are located in the Bohemia in the west and in the Pannonian and North-Carpathian basins in the east (Pawlewicz et al., 2003; Kulke, 1994).

## **SLOVENIA**

First discovery	1942
First production year	1943
Oil production, 1999 (m.t)	0.001
Gas production	---
Oil reserves, 2001 (m.t)	0.003
Gas reserves	---

m.t = million tonnes

(Kulke, 1994; World Energy Council, 2001)

#### ***Discovery history***

Although oil seeps in the Pannonian Basin in Slovenia have been known for some centuries, exploration in Slovenia started in the 1940s when the north-western regions of the Former Yugoslavia were surveyed. Fields Dolina and Petisovci were discovered in 1942 and 1943, respectively (Kulke, 1994; World Petroleum, 2003).

#### ***Production history***

The first formal production in Slovenia took place in 1943 when the Dolina and Petisovci fields came on stream. Slovenian produces little oil and gas and only three fields are under production (Nafta Lendava, year unknown; World Petroleum, 2003; World Energy Council, 2001).

#### ***Geographic distribution***

In Slovenia the most important area for oil and gas occurrences is the Pannonian Basin in the north-eastern part of the country (Pawlewicz et al., 2003; Kulke, 1994; World Energy Council, 2001; World Petroleum, 2003).

## SOMALIA

### ***Discovery history***

Exploration in Somalia began in 1952 resulting in some good oil shows. In 1991 good oil and gas potential was reported from the northern Somalia, but due to the political unrest all exploration has been suspended. Gas reserves are estimated to be about six billion cubic meters (Fineman, 1993; Eni, 2003b; 1Up Info, year unknown).

### ***Production history***

Up to 2003 no oil or gas production has been reported (Mbendi, 2000; Eni, 2003a).

### ***Geographic distribution***

In Somalia there are oil and gas seeps in the northern and southern part of the country (1Up Info, year unknown; Eni, 2003b).

## SOUTH AFRICA

First gas discovered	1969
First production year	1992
Oil production, 1999 (m.t)	1.5
Gas production	---
Oil reserves, 2001 (m.t)	7.4
Gas reserves	---

m.t = million tonnes

(Mbendi, 2003; World Energy Council, 2001)

### ***Discovery history***

In South Africa exploration for oil and gas began in 1965 in the Karoo Basin, but the first gas was discovered in the Pletmos Basin in 1969. The offshore field Oribi was discovered in 1990 south-west of Mossel Bay and in 2000 new discoveries were made close to the Namibian border (Kulke, 1995; Mbendi, 2003).

### ***Production history***

The first formal production in South Africa took place in 1992 when gas fields in the Bredasdorp Basin came on stream. They were followed by the Oribi Field in 1997, the first commercial oil production in the country (Mbendi, 2003; World Energy Council, 2001).

### ***Geographic distribution***

The most important areas for oil and gas occurrences in South Africa are the Orange River Basin near Namibia and the offshore basins Bredasdorp and Pletmos in the south (Persits et al., 1997; Mbendi, 2003).

**SOUTH KOREA*****Discovery history***

Onshore exploration in South Korea began in 1963 but was not successful. In 1969 offshore exploration started but the first discovery was made in 1998, when the Donghae gas field was found in the East Sea (Kulke, 1994; CCOP, 2002h).

***Production history***

The first commercial production in South Korea took place in November 2003 when the Donghae gas field came on stream (CCOP, 2002i; EIA, 2003).

***Geographic distribution***

Country's only hydrocarbon field is located in the East Sea. The Yellow Sea is considered to have good potential (CCOP, 2002h; CCOP, 2002i).

**SPAIN**

First discovery	1960
First production year	1966
Oil production, 1999 (m.t)	0.8
Gas production, 2001 (bn.m <sup>3</sup> )	0.005
Oil reserves, 2001 (m.t)	2.0
Gas reserves, 2001 (bn.m <sup>3</sup> )	0.2

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

***Discovery history***

Exploration in Spain started in 1940s. The first gas field, Castillo, was found in 1960 and the first oil field, Ayoluengo, in 1964, both located in the north-eastern part of the country. Offshore exploration started in 1968 and in 1970 the Amposta Marino Field was discovered in the Mediterranean Sea near Tarragona. Several fields, both onshore and offshore, were found in the 1970s and the 1980s (Kulke, 1994; Petroleum Economist, 2003).

***Production history***

The first commercial oil production in Spain took place in 1966 (the Ayoluengo Field). Gas production commenced in the beginning of the 1980s and the Marismas Field came online in 1990. Several fields had been depleted by the 1990s and production of oil and gas is steadily decreasing (World Energy Council, 2001; Kulke, 1994).

***Geographic distribution***

Majority of oil and gas is located in the Iberic Cordillera Basin in the eastern part of the country and the Alentejo-Guadalquivir Basin in the south-west Spain. The Spanish Trough-Cantabrian Zone in the northeast has potential (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

First oil discovered	1979
First production year	1992

Oil production, 1999 (m.t)	3.2
Gas production	---
Oil reserves, 2001 (m.t)	36
Gas reserves, 2001 (bn.m <sup>3</sup> )	85

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(EIA, 2003; World Energy Council, 2001; Mbendi, 2001)

#### ***Discovery history***

In 1979 oil was discovered in the Muglad area (the Abu Gabra Field), followed by the Unity and Heglig fields in 1980 and 1982. (General Petroleum Corporation of Sudan, 1995; Mbendi, 2001; EIA, 2003).

#### ***Production history***

It is reported that the first formal production in Sudan took place in 1992, but there is no information about the location. The Unity and the Heglig fields came on stream in 1996 (World Energy Council, 2001; Mbendi, 2001).

#### ***Geographic distribution***

Majority of Sudan's hydrocarbon reserves are located in the interior basins in the southern and south-eastern Sudan (Mbendi, 2001).

## **SURINAME**

First discovery	1965
First production year	1982
Oil production, 1999 (m.t)	0.7
Gas production	---
Oil reserves, 2001 (m.t)	11
Gas reserves	---

m.t = million tonnes

(Kulke, 1995; van Dijck et al., year unknown; World Energy Council, 2001)

#### ***Discovery history***

Exploration in the Guyana Basin started in 1938. Oil was found at Calcutta in 1965. Offshore exploration for oil and gas started in 1958 and between 1974 and 1978 several oil and gas shows were found. The only commercial field in Surinam was discovered onshore in 1981 (the Tambaredjo Field) (Kulke, 1995; World Energy Council, 2001).

#### ***Production history***

Oil production in Suriname started in 1982 (the Tambaredjo Field) (van Dijck et al., year unknown; Kulke, 1995).

#### ***Geographic distribution***

Hydrocarbon occurrences are located in the Guyana-Suriname Basin, near capital Paramaribo (Schenk et al., 1999; Kulke, 1995; World Energy Council, 2001).

**SWEDEN*****Discovery history***

Alum Shales in Sweden have been known at least since 1637. In the beginning of the 20<sup>th</sup> century a small oil field was found at Kinnekulle in the south Sweden, followed by gas and oil shows on the island of Öland. On Gotland and central Sweden oil was found in the 1970s (Kulke, 1994).

***Production history***

Production from Alum Shales started in 1637 and in Kinnekulle there was some production in the early 20<sup>th</sup> century. In the mid-1970s small scale production started on Gotland, but extraction is very limited. Since 1996 there has not been any production in Sweden (Kulke, 1994; CIA, 2003).

***Geographic distribution***

Oil and gas occurrences are located in the southern Sweden near the lakes Vänern and Vättern and on the islands Gotland and Öland in the southern Sweden (Pawlewicz et al. 2003; Kulke, 1994).

**SWITZERLAND*****Discovery history***

Asphalt seeps in the country have been known for centuries and the first oil well was drilled in 1889 at La Plein. Modern exploration started in the 1920s but succeeded first in 1962/63 when the Essertines Field was found in the western part of the country. The only commercial gas deposit was discovered at Entlebuch in the Molasse Basin in 1980 (SES, 2003; SGTK, year unknown; Kulke, 1994).

***Production history***

The asphalt deposits were exploited until 1867. At the Entelbuch Field gas was produced 1985 – 1994. For 2001 no oil or gas production is reported (SES, 2003; SGTK, year unknown; Kulke, 1994; CIA, 2003).

***Geographic distribution***

Majority of gas and oil is found in the Molasse Basin in the central Switzerland. (Pawlewicz et al., 2003; Kulke, 1994).

**SYRIA**

First discovery	1956
First production year	1968
Oil production, 1999 (m.t)	29.1
Gas production, 2001 (bn.m <sup>3</sup> )	5.8
Oil reserves, 2001 (m.t)	343
Gas reserves, 2003 (bn.m <sup>3</sup> )	240

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; EIA, 2003)



**Discovery history**

The first discovery was the Karatchok Field in 1956 in the north-west Syria. The Jebisseh Field was discovered in 1968 and several further discoveries were made in the 1980s and 1990s (Kulke, 1994; Anonymous, 2001; EIA, 2003).

**Production history**

Production started in 1968 and has been increasing over the decades (Kulke, 1994; World Energy Council, 2001; Worldinformation.com\_2, year unknown; EIA, 2003).

**Geographic distribution**

Majority of oil and gas is located in the Euphrates/ Mardin region, the Palmyra Zone, the Kleisha Uplift and the Zagros Fold Belt in the central and eastern Syria (Pollastro et al., 1999a; Petroleum Economist, 2003).

**TAIWAN**

First discovery	At least by 1861
First production year	1861
Oil production, 1999 (m.t)	0.1
Gas production, 1989 (bn.m <sup>3</sup> )	0.034
Oil reserves, 2001 (m.t)	0.6
Gas reserves, 1989 (bn.m <sup>3</sup> )	23

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001)

*NOTE:* We were not able to find any information about the oil and gas fields in Taiwan. Therefore the dataset does not contain any information about discovery or production years

**Discovery history**

The first discovery in Taiwan had been made by 1861. Several onshore and offshore discoveries have been made, especially after the Second World War (Kulke, 1994).

**Production history**

In Taiwan the first formal production took place in 1861 and in 1945 there were production at seven fields. Production peaked in 1977/78. Offshore production started in 1986 (Kulke, 1994).

**Geographic distribution**

Majority of oil and gas is located in the western Taiwan and in the Taiwan Strait (Kulke, 1994; Steinshouer et al., 1999).

**TAJIKISTAN**

First discovery	1908
First production year	1979

Oil production, 1999 (m.t)	0.02
Gas production, 2000 (bn.m <sup>3</sup> )	0.04
Oil reserves, 2001 (m.t)	1.6
Gas reserves, 2003 (bn.m <sup>3</sup> )	5.7

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(EIA, 1994; World Energy Council, 2001; INOGATE, 2003f)

#### ***Discovery history***

Exploration in the Fergana Basin, which is shared between Tajikistan, Kyrgyzstan and Uzbekistan, started in the 19<sup>th</sup> century. The first discovery in the Tajikistan side of the basin was made in 1908 (the Kim Field). It was followed by the Nefteabad Field in 1933. Several discoveries have been made in the Afghan-Tajik Basin, but we were not able to date these discoveries (EIA, 1994; World Energy Council, 2001; Persits et al., 1998).

#### ***Production history***

We were not able to find reliable information on when production in Tajikistan started. In the Fergana Basin the first gas production is reported for 1979 but there is no information about the exact location. The Afghan-Tajik Basin has been producing at least since the mid 1980s (EIA, 1994; World Energy Council, 2001).

#### ***Geographic distribution***

Majority of oil and gas is found in the Fergana Basin in the north and in the Afghan-Tajik Basin in the southwest (Persits et al., 1998; World Energy Council, 2001).

### **TANZANIA**

#### ***Discovery history***

The first exploration wave took place 1952 – 1964, without results. In 1969, the Tanzania Petroleum Development Corporation was founded and a new phase of exploration started and in 1974 the Songo Songo gas field was discovered. The Mnazi Bay Field was found in 1982. (Mbendi, 2001; Tanzania Petroleum Development Corporation, 2001a).

#### ***Production history***

No production has occurred in Tanzania but there are plans to develop the the Mnazi Bay Field (Tanzania Petroleum Development Corporation, 2001b).

#### ***Geographic distribution***

The main areas of oil and gas occurrences in Tanzania are the basins Ruvuma, Mandawa and Mafia (Tanzania Petroleum Development Corporation, 2001b).

### **THAILAND**

First discovery	1921
First production year	1959
Oil production, 1999 (m.t)	5.3
Gas production, 1999 (bn.m <sup>3</sup> )	17.7
Oil reserves, 2001 (m.t)	47

Gas reserves, 2001 (bn.m <sup>3</sup> )	345
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m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(CCOP, 2002j; Kulke, 1994; World Energy Council, 2001)

#### ***Discovery history***

Exploration in Thailand started in 1921 in the Fang Basin in the northern part of the country. In 1973 the first offshore field, Erawan, was discovered in the Gulf of Thailand. Since then several discoveries have been made both offshore and onshore (CCOP, 2002j; Kulke, 1994).

#### ***Production history***

Commercial production in Thailand started in 1959 in the Fang Basin. The first offshore field came on line in 1981. (Kulke, 1994; CCOP, 2002j; EIA, 2003).

#### ***Geographic distribution***

Majority of oil and gas is found in the central part of the country and in the Gulf of Thailand (Kulke, 1994; Steinshouer et al., 1999).

### **TRINIDAD AND TOBAGO**

First discovery	1866
First production year	1908
Oil production, 1999 (m.t)	6.7
Gas production, 1999 (bn.m <sup>3</sup> )	11.7
Oil reserves, 2001 (m.t)	85
Gas reserves, 2001 (bn.m <sup>3</sup> )	602

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(DeLuca, 2002; Geological Society of Trinidad and Tobago, year unknown; Kulke, 1995; World Energy Council, 2001)

#### ***Discovery history***

In Trinidad and Tobago exploration started already in the 1860s (Trinidad) and the first discovery was made in 1866 at Aripere. Several discoveries were made in the 1910s. The first offshore field was discovered in 1954 (the Soldado Field) in the Gulf of Paria (east of Trinidad). Other offshore discoveries have been made east of Trinidad (first in 1968) and in the Tobago Through Basin (fields Chaconia, Hibiscus and Poinsettia in 1975) (Kulke, 1995; Geological Society of Trinidad and Tobago, year unknown; Petroleum Economist, 2003; Oil & Gas Journal, 2001b; Schenk et al., 1999).

#### ***Production history***

The first commercial production in Trinidad and Tobago is reported for 1908; oil exportation started in 1910. Offshore production commenced in 1955 (the Soldado Field). Production from offshore fields at Trinidad's east coast started in 1972. In the Tobago Through the first field started production in 2002 (Kulke, 1995; Geological Society of Trinidad and Tobago, year unknown; Oil & Gas Journal, 2001b; Petroleum Economist, 2003; Schenk et al., 1999).

#### ***Geographic distribution***

Onshore oil and gas occurrences are located on the southern Trinidad. Offshore fields are found both east and west of Trinidad and in the Tobago Trough north of the islands (Schenk et al., 1999; Petroleum Economist, 2003; Kulke, 1995).

## TUNISIA

First oil discovered	1948
First production year	1966
Oil production, 1999 (m.t)	4
Gas production	---
Oil reserves, 2001 (m.t)	40
Gas reserves	---

m.t = million tonnes

(Anonymous, 2001; Kulke, 1995; World Energy Council, 2001)

### **Discovery history**

In Tunisia the first oil field, Sidi Abderrahmane, was found in 1948 at the Cap Bon in the northern Tunisia. Since the mid 1960s several fields, both onshore and offshore, have been discovered (Anonymous, 2001; Kulke, 1995).

### **Production history**

Oil production in Tunisia started in 1966. In 2003 three fields, El Borma, Ashtart and Sidi el Kilani accounted for 75% of all oil production in the country (Kulke, 1995; EIA, 2003).

### **Geographic distribution**

Majority of oil and gas in Tunisia is found in the offshore areas east of Tunisia and in the central parts of the country (Mbendi, 2001).

## TURKEY

First discovery	1940
First production year	1948
Oil production, 1999 (m.t)	2.9
Gas production, 2001 (bn.m <sup>3</sup> )	0.3
Oil reserves, 2001 (m.t)	43
Gas reserves, 2001 (bn.m <sup>3</sup> )	8.6

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; World Energy Council, 2001; CIA, 2003)

### **Discovery history**

The Raman Field in the south-east was discovered in 1940. This was followed by several discoveries in the same area. In the 1960s discoveries were made in the Adana Basin. In the Thrace Basin discoveries have been made since 1970, including one offshore field (Kulke, 1994; Anonymous, 2001; Pawlewicz et al., 2003).

### **Production history**

The first formal oil production in Turkey took place in 1948 when the Raman Field came on stream. In the south-east several fields started operating in the 1960s. The Kuzey Field was the first offshore field to start production. In general, total production in Turkey has been declining since 1991 (Kulke, 1994; World Energy Council, 2001; Omax Resources Ltd., 2004; Turkish Daily News, 1998; EIA, 2003).

#### **Geographic distribution**

In Turkey one of the most important areas for oil and gas occurrences is the Thrace Basin in the northwestern part of the country (both onshore and offshore). Several basins, like the Adana Basin and the Zagros Fold Belt, in the south and south-east are also important (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

### **TURKMENISTAN**

First discovery	Early 1800s
First production year	1911
Oil production, 1999 (m.t)	7.1
Gas production, 1999 (bn.m <sup>3</sup> )	22.8
Oil reserves, 2001 (m.t)	75
Gas reserves, 2001 (bn.m <sup>3</sup> )	2 860

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Turkmenistan2000, year unknown; World Energy Council, 2001)

#### **Discovery history**

Oil and gas have been known to exist in Turkmenistan for centuries near the Caspian Sea. We were not able to find information about the first offshore discovery (assumed to be 1955 in the dataset). In the Amu-Darya Basin (eastern Turkmenistan) the first discovery was made in 1956 (the Darwasa Field) (Turkmenistan2000, year unknown; Kulke, 1995).

#### **Production history**

Already in 1838 extraction is reported from the Cheleken onshore field, but the first commercial production took place in 1911. In 1929 the giant onshore field Nebit Dag came on stream (Turkmenistan2000, year unknown; World Energy Council, 2001; INOGATE, 2003g).

#### **Geographic distribution**

Majority of oil and gas are found in the west Turkmenistan (the South Caspian Basin, onshore and offshore) and in the Amu-Darya Basin in the central and eastern part of the country (Turkmenistan2000, year unknown; Persits et al., 1998).

### **UKRAINE**

First discovery	Beginning of 18 <sup>th</sup> century
First production year	1860
Oil production, 1999 (m.t)	3.7
Gas production, 1999 (bn.m <sup>3</sup> )	18.1

Oil reserves, 2001 (m.t)	173
Gas reserves, 2001 (bn.m <sup>3</sup> )	825

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

### **Discovery history**

Already in the beginning of the 18<sup>th</sup> century oil was found in the North Carpathian Basin. In the Dnieper-Donet Basin exploration started in the 1930s and the first significant discovery was made in 1950 when the Shebelinka and Radchenkov fields were found. In the following years exploration also started in the Crimea Basin and the Azov-Kuban Basin (Kulke, 1995; Ulmishek, 2001a; NSJC Chronomornaftogaz, 2001a; NSJC Chronomornaftogaz, 2001b).

### **Production history**

The first commercial production in Ukraine took place in 1860 when the Boryslaw and Bitkow fields in the North Carpathian Basin came on stream. In 1966 the first field in the Crimea Basin started production (Kulke, 1995; NSJC Chronomornaftogaz, 2001a).

### **Geographic distribution**

The most important areas for oil and gas occurrences in Ukraine are the North Carpathian Basin in the western part of the country, the Dnieper-Donets Basin in the north-east and the onshore and offshore regions of the Crimea Peninsula (the Black Sea and Sea of Azov) (Persits et al. 1998; World Energy Council, 2001; NSJC Chronomornaftogaz, 2001b).

## **UNITED ARAB EMIRATES**

*Abu Dhabi, Dubai, Sharjah, Ras Al Khaimah, Umm Al Qaiwain, Ajman, Fujairah*

First discovery	1958
First production year	1962
Oil production, 1999 (m.t)	107.5
Gas production, 1999 (bn.m <sup>3</sup> )	38.0
Oil reserves, 2001 (m.t)	12 915
Gas reserves, 2001 (bn.m <sup>3</sup> )	6 003

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Butt, year unknown; World Energy Council, 2001)

### **Discovery history**

In Abu Dhabi and Dubai the search for oil and gas started in 1936. The first discovery in Abu Dhabi was made in 1958 (the Murban Bab Field). In Dubai the offshore field Fateh was discovered in 1966. Exploration in the northern parts of the Emirates succeeded in 1972 (the offshore Mubarek Field). In Ras Al Khaimah the offshore field Saleh was discovered in 1982. Exploration in Umm Al Qaiwan, Ajman and Fujairah has not been successful (Kulke, 1994; Anonymous, 2001; Butt, year unknown; World Energy Council, 2001).

### **Production history**

The first commercial production in the United Arab Emirates (UAB) is reported from 1962 (the offshore field Umm Sharif in Abu Dhabi). The Mubarek Field in Sharjah commenced production in 1974 and was followed by the Margham Field in Dubai in 1982. Abu Dhabi and

Dubai are the major producers in the UAB and the oil reserves of Abu Dhabi account for over 90% of all reserves (Butt, year unknown; World Energy Council, 2001).

#### **Geographic distribution**

Majority of oil and gas reserves are located in Abu Dhabi, both onshore and offshore (Pollastro et al., 1999a; Petroleum Economist, 2003).

### **UNITED KINGDOM**

First discovery	1919
First production year	1919
Oil production, 1999 (m.t)	137.1
Gas production, 1999 (bn.m <sup>3</sup> )	98.7
Oil reserves, 2001 (m.t)	665
Gas reserves, 2001 (bn.m <sup>3</sup> )	760

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1994; Oil and Gas Investor, 2004; World Energy Council, 2001)

#### **Discovery history**

The first modern discovery was made in 1919 (the Hardstoft Field) in the Anglo-Dutch Basin in the eastern part of the United Kingdom. In the south the Kimmeridge Field was found in 1959. The Leman Field was the first offshore discovery in the North Sea (1966) and in 1974 the Morecambe Field was found in the Irish Sea (Kulke, 1994; Pawlewicz et al., 2003; Edgon Resources (U.K.) Limited, 2000; United Kingdom Offshore Operators Association, 2002b; BP, year unknown).

#### **Production history**

In the United Kingdom production from oil shale started in the 19<sup>th</sup> century in the Scotland Midland Valley, but the first commercial production took place in 1919 when the Hardstoft Field came on stream. The Kimmeridge Field commenced production in 1961 and the first offshore field, Leman, was put into production in 1968 (Kulke, 1994; Oil And Gas Investor, 2004; Edgon Resources (U.K.) Limited, 2000; World Energy Council, 2001).

#### **Geographic distribution**

Majority of oil and gas is found in the North Sea although there are several discoveries also in the Irish Sea. The most important onshore areas for oil and gas occurrences are the Anglo-Dutch Basin in the central England and the Anglo-Paris Basin in the south England (Pawlewicz et al., 2003; Kulke, 1994; Petroleum Economist, 2003).

### **UNITED STATES OF AMERICA**

First discovery	1859
First production year	1859
Oil production, 1999 (m.t)	353.8
Gas production, 1999 (bn.m <sup>3</sup> )	527.3

Oil reserves, 2001 (m.t)	3 278
Gas reserves, 2001 (bn.m <sup>3</sup> )	4 740

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

### ***Discovery history***

The first modern discovery was made in 1859 in Pennsylvania. In the Ventura Basin in the western part of the country the Santa Paula Field was found in 1861. In 1873 the Iola Field in the Cherokee platform in the central USA was discovered. Exploration succeeded in the Gulf of Mexico in 1901 (the Spindletop Field) and in Alaska the first oil was found in 1946 (the Umiat Field) (Kulke, 1995; Keller, 1995; Klett et al., 1997; Charpentier, 1995a; Schenk et al., 1995; Magoon et al., year unknown; Earth Sciences and Resources Institute, 1995; Kenai Peninsula Borough-Community and Economic Development Division, 2002).

### ***Production history***

The first formal oil production took place in 1859. Production in USA peaked in 1970 and has been steadily declining thereafter. There is no exact information about the first offshore production in the country, but several fields in the southern Alaska came on stream in 1967. (Ryder, 1995a; Ryder, 1995c; Klett et al., 1997; Kulke, 1995; Kenai Peninsula Borough-Community and Economic Development Division, 2002).

### ***Geographic distribution***

The most important areas for onshore oil and gas occurrences are the Eastern Interior and the Mid-Continent areas in the eastern USA and the West Texas, eastern New Mexico and the Gulf of Mexico. The Colorado and Rocky Mountains and Alaska are also important production regions. The significant offshore areas are located in the Beaufort Sea (Alaska) and in the Gulf of Mexico (Kulke, 1995; Earth Sciences and Resources Institute, 1995; Petroleum Economist Ltd, 2003).

## **UZBEKISTAN**

First discovery	1934
First production year	1945
Oil production, 1999 (m.t)	8.1
Gas production, 1999 (bn.m <sup>3</sup> )	55.6
Oil reserves, 2001 (m.t)	81
Gas reserves, 2001 (bn.m <sup>3</sup> )	1 875

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; Ulmishek, 2001e; World Energy Council, 2001)

### ***Discovery history***

We were not able to find reliable information for the first discovery (it is assumed to be 1934 in the country profile). For the Fergana Basin, which now lies in Uzbekistan, Kyrgyzstan and Tajikistan, first drilling is reported for 1880. The first important gas discovery was made in 1956 when the Gazlinskoye Field was found in the Amu-Darya Basin in the east. Since then there have been numerous oil and gas discoveries in Uzbekistan (Kulke, 1995; World Energy Council, 2001).



**Production history**

There is no exact information about when the oil and gas production in Uzbekistan started. It is reported that Uzbekistan has been an oil producer for more than a century (we have set the first formal production to 1945 in the dataset). The North Ustyurt Basin has been producing at least since 1960. The fields in the Central Ustyurt and Southwest Gissar area are under development and production start is planned for 2006 (World Energy Council, 2001; Ulmishek, 2001e; EIA, 2003).

**Geographic distribution**

The most important areas for oil and gas occurrence in Uzbekistan are the basins Fergana, Amu-Darya and Afghan-Tajik basins in the south/south-east and the North Ustyurt Basin in the northern part of Uzbekistan (Persits et al., 1998; Kulke, 1995).

**VENEZUELA**

First discovery	1914
First production year	1917
Oil production, 1999 (m.t)	162.1
Gas production, 1999 (bn.m <sup>3</sup> )	26.8
Oil reserves, 2001 (m.t)	11 048
Gas reserves, 2001 (bn.m <sup>3</sup> )	4 152

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Kulke, 1995; World Energy Council, 2001)

**Discovery history**

For centuries tar was exploited from oil seeps at Lake Maracaibo in Venezuela, but modern exploration commenced first in 1905 at Pedernales. The search for oil gas succeeded in 1914 in the Maracaibo Basin (the Mene Grande Field). In 1928 the Quiriquire Field was found in the East Venezuela Basin. Offshore exploration had its first success in 1925 when the Lagunillas Field was found in the Lake Maracaibo (Kulke, 1995; Schenk et al., 1999; Petroleum Economist, 2003; Martinez, 1999; Anonymous, 2001).

**Production history**

The first commercial production in Venezuela took place in 1917 but there is no information about the location. The Cumarebo Field in the Falcon Basin started operating in 1931 and in the East Venezuela Basin the Temblador Field came on stream in 1936 (World Energy Council, 2001; PetroFalcon, 2003; Schenk et al., 1999; Petroleum Economist Ltd, 2003; Harvest Natural Resources Inc., 2003; Phillips66, 1998; IPD Latin America Venezuelan EnergyNet, 2004).

**Geographic distribution**

Majority of oil and gas is found in the Maracaibo Basin in the north-west and in the East Venezuela Basin (Schenk et al., 1999; Petroleum Economist, 2003; Kulke, 1995).

**VIETNAM**

First discovery	1981
First production year	1986
Oil production, 1999 (m.t)	14.6
Gas production	---
Oil reserves, 2001 (m.t)	82
Gas reserves	---

m.t = million tonnes

(Anonymous, 2001; World Energy Council, 2001)

#### ***Discovery history***

Exploration for oil and gas in Vietnam started in the early 1960s but the first significant discovery was made in 1981 (the offshore field Bach Ho) (CCOP, 2002k; Anonymous, 2001).

#### ***Production history***

In Vietnam oil production started when the Bach Ho Field came on stream in 1986. The Rong and Dai Hung fields followed in 1994, and in 2002 Vietnam was producing from six oil fields (CCOP, 2002k; World Energy Council, 2001).

#### ***Geographic distribution***

Oil and gas in Vietnam is located offshore, south of the country (Steinshouer et al., 1999; Petroleum Economist, 2003).

## **YEMEN**

First discovery	1984
First production year	1986
Oil production, 1999 (m.t)	18,8
Gas production	---
Oil reserves, 2001 (m.t)	525
Gas reserves, 2001 (bn.m <sup>3</sup> )	479

m.t = million tonnes

bn.m<sup>3</sup> = billion cubic meters

(Anonymous, 2001; Kulke, 1994; World Energy Council, 2001)

#### ***Discovery history***

The first discovery was made in 1984 when the Alif Field was found in Ma'rib Basin in the former North Yemen. It was followed by some discoveries in the Shabwa area in 1987 and in 1991 the first fields in the Masila region were discovered. Offshore field Sharmah was discovered in 1982 (Kulke, 1994; Oil & Gas Directory, 2003a).

#### ***Production history***

The first commercial oil production in Yemen is reported for 1986 (the Alif Field). First fields in the Masila area went on stream in 1993 (Kulke, 1994; Nexen, 2003; Oil & Gas Directory, 2003a).

#### ***Geographic distribution***

Oil and gas occur in the basins Ma'rib, Shabwa and Masila, all located in the central Yemen (Pollastro et al., 1999a; Petroleum Economist, 2003; Kulke, 1994).

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